INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC
GUTTA-PERCHA
Reg. U.S. Pat. Off.
Reg. United Kingdom.

Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.
No. 25 West 45th Street, New York

Telephone—Bryant 2576

CABLE ADDRESS: IRWORLD, NEW YORK

Member of the National Publishers' Association

HENRY C. PEARSON, F.R.G.S., Editor

Vol. 67 MARCH 1, 1923 No. 6

SUBSCRIPTION: $3.00 per year, $1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, $3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made on application.

REMITTANCES: Should always be made by bank draft, Post Office or Express Money Order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

Table of Contents.....Text Page 410
Advertisers' Index .....Advertising Page 112
Classified Advertisements.....Advertising Pages 62-70
Buyers' Directory .....Advertising Pages 73-110

Rubber Latex and Dispersed Rubber

THE belief, expressed by some, that dispersed rubber will oust rubber latex from the market is no doubt honest but not in accord with the facts of the case. Rubber latex is bound to produce a stronger rubber than dispersed rubber made from rubber itself. It is also cheaper to import latex than it is to pay the price for coagulation and subsequent dispersion. This of course refers to plantation products where either latex or rubber can easily be obtained in quantity.

When one considers the various wild rubbers, however, the case is quite different. The native rubber gatherers, Asiatic, African, Central and South American, stand ready to produce thousands of tons of rubber, but could be relied upon to furnish little latex. Nor could preservatives and tanks be sent to wild rubber regions economically or successfully. But wild rubber dispersed would be a commercial blessing. Instead of hundreds of grades, a score would suffice. Thus standardization would finally be effected where it has long been deemed impossible.

For American Owned Rubber

THE Stevenson plan of rubber restriction has resurrected interest in rubber planting as nothing else could have done. According to "Washington correspondents" the President of the United States and his Cabinet have taken up the question of planting in the Philippines "if the soil is favorable." With thousands of thrifty Heveas already producing on Basilan Island it would seem that soil and climate might be adjudged beneficent. Moreover, with the great island of Mindanao close to Basilan—a miniature continent, tropical, hurricaneless, with soil and climate even better for Hevea than the Malay States or Sumatra possess—commissions or expeditions or survey are not at all necessary.

The story has been told many times; the records are exhaustive and authentic. The need is not for examination, but for a little constructive law-making. A bill allowing Chinese coolies in Mindanao for rubber plantation work, passed by the Philippine Legislature and Senate, approved by General Wood, and later by the President of the United States (or if not approved or disapproved by our chief executive within six months it automatically becomes a law) is practically all that is necessary. There is ample territory for rubber planting, an abundance of seed, hundreds of trained plantation managers in the British and Dutch possessions.

As the British planters point out, it is six years from planting to production; but when that short time has elapsed, unless all signs fail, consumption will have so far overtaken production that another rubber famine will impend. Dollar rubber is by no means an improbability in 1928.

Or it is not at all impossible that the Valley of the Amazon might again become the world's rubber reservoir. If Brazil would encourage coolie labor, abolish import taxes on plantation equipment, and assess only a moderate export tax on plantation rubber instead of the present 23 per cent, with a guarantee for a sufficient term of years, Pará could rival Singapore. The Hevea would again bring prosperity to the vast reaches of the most fertile country in the world.

Nor should it be forgotten that Hevea has been successfully grown in Southern Mexico, and that Guatemala, Nicaragua, Colombia, and Venezuela all have land adapted for its culture.

The Stevenson plan is economically unsound, but it may eventually prove of inestimable benefit not only to the harassed British rubber shareholder, but to the whole rubber trade.

Foremen Are Keymen

A COMPANY may have a model plant, an admirable production program, and an enlightened labor policy; but all these advantages may count for little if it lacks the hearty and intelligent cooperation of the keymen of the industry, the foremen, who, as a matter of fact, immediately control production. The average foreman may be loyal and industrious but too often he is a slow thinker, self-satisfied, convinced that he cannot be taught much more about his work, and peculiarly resentful of management attempts to show him how he might improve his methods. Yet oddly enough he will often acquiesce readily in a proposal from outside industrial management experts to canvass his work, mildly amused at the chance to prove that a point of his practical experience is worth a barrel of their theories. As often as not he goes to the class conferences to scoff, but remains to pray.

Under a well standardized course of training by clever specialists most foremen soon acquire a broad grasp of the fundamentals of modern industrialism, and often develop a surprising amount of efficiency. Instances are cited where, as a result of such intensive drilling, the output of factories, some of them large rubber concerns, has been increased even 42 per cent in a few months without greater working force, and almost invariably the product has been much improved.

Statistical Reports Necessary

ECONOMIC experts say that one of the chief causes of industrial depression is the lack of exact information as to certain basic facts in general lines of business; and that overproduction, irregular employment, and general instability will continue to trouble employer and employe so long as the captains of industry are compelled in planning their operations to rely upon mere guesses or arbitrary estimates of what are the people's needs and what materials are available to supply such needs. It is claimed that were manufacturers in all lines to furnish essential information freely and frequently they would not merely do their country a great service but benefit themselves in a large degree, as the Department of Commerce is only too pleased to summarize all such data and disseminate it promptly and in most helpful form. An excellent beginning has been made in its new service, "Survey of Current Business," but it is eager to supplement this with daily bulletins that will afford a guide to the state of trade that will be of greater value. To make it really effective it wants ampler reports on industry.

Some chagrin is expressed at the seeming indifference on the part of some rubber manufacturers to cooperate with the Federal department mentioned, although it is noted that other industries are much more remiss than the rubber men in supplying trade information. The largest manufacturers of tires readily give out their monthly production of casings and tubes, just as the largest steel making concern publishes quarterly its unfilled tonnage, banks give their weekly clearings, newspapers print sworn statements of circulation, automobile makers issue figures regularly on their output, and other concerns take the public into their confidence to an increasing extent. Indeed, the tendency of the times is plainly toward making more open avowal of the nature, extent, and general operations of business, without necessarily disclosing the nature of any essential private affairs of a concern. If the rubber industry has not told in minute detail about the quantity of raw material consumed and what disposition has been finally made of all of it, perhaps an explanation may be found in the fact that in no other industry is there such a great number and wide variety of products. It is not a simple task to mass statistics for such a trade, but doubtless a way will be found and efforts are now being made toward doing it in a measurable degree at least, and it has already been shown that rubber manufacturers are quite as willing to cooperate with the government as any.

Pride in Rubber Craftsmanship

ARE employes proud of what they accomplish or do they merely function like so many automatons? One of the worst indictments the old-time artisan brings against the modern industrial establishment is that it destroys craftsmanship, that it deprives a worker of the incentive to glory in his shop achievements, and that it lessens his initiative and sense of responsibility; with the result that, though mass production may be increased, the interest of the worker is decreased and closer inspection and more constant supervision are required.

One of the thinking manufacturers started several years ago to imbue his employes with a sense of responsibility and proprietorship, and encourage among them pride of craftsmanship. After putting his ideas into practice not only did he notice a marked improvement in the morale of the workers, but he found that individual production jumped from 60 per cent in 1919 to 80 per cent in 1920, and that even with a smaller organization he kept up the volume of business and the percentage of profit. "The pride of craftsmanship," he claims, "can be restored to workers in any office, store, or factory. It will increase production, awaken creative ability, cut costs, and pay dividends to manufacturers and employes. It will elevate the moral, spiritual and intellectual level of the whole organization."

WE HAVE BEEN URGED BY RELIGIOUS ORGANIZATIONS to publish each month a verse from the Bible. In reverence for the "Book of books," with the firm conviction that its wisdom applied to daily life would solve all problems, we have consented. The verse for this month is:

"Do violence to no man, neither accuse any falsely, and be content with your wages." Luke 3:14.

Philippine Rubber Planting Possibilities

American Grown Rubber—Mindanao Capable of Supplying Entire American Industry

THE desirability of an American supply of crude rubber grown in the Philippines under the American flag is being urged as a result of the British export restriction plan affecting Malayan and Ceylon rubber that now threatens not only a shortage this year but an abnormal price advance in consequence.

Realizing the feasibility of such a project, the editor of THE INDIA RUBBER WORLD during the winter of 1916-1917 spent several months investigating rubbber planting conditions in the Philippines and published a series of ten articles on the subject beginning in our July, 1917, issue. For a comprehensive, detailed survey of conditions and possibilities there the interested reader is referred to those articles. Briefly, they indicate that soil and climate leave nothing to be desired; that there are already plantations enough to furnish seed for large areas; and that if land tenure and immigration laws can be amended and some assurance of stable Philippine government and future American protection given, Mindanao can soon become another Sumatra in its rubber production.

Five and a Half Year Old Hevea, Basilan

Existing Plantations Provide Adequate Seed Supply

Rubber planting in the Philippines is not a new nor untried idea. President McKinley suggested it in a message to the Fifty-sixth Congress, in 1899, but he did not specify Hevea rubber, and much time was wasted with Ceara and Castilloa. While they both grew well, it was, as in Malaya, found unprofitable to extract the latex from them.

As early as 1906, however, the Philippine Bureau of Forestry obtained several thousand seeds from Ceylon, which were planted in boxes and the seedlings distributed to planters throughout the Southern Islands, where they made remarkable growth. In eleven years trees showed 66 inches girth three feet from the ground. From 1906 onward Hevea planting went on steadily, there being in 1917 two flourishing plantations with 100,000 trees and other smaller estates. Of them the best known are the "Basilan" and "Balactasan" estates on Basilan Island just south of Zamboanga, the capital city of Mindanao; the "Rio Grande" estate in the Province of Cotabato, Mindanao, and the "Chicago" estate near Calapan, Mindoro Island.

Thus adequate local supplies of fertile Hevea seed for starting further plantations already exist in the Philippines. This is fortunate as thus far Philippine plantations are free of the host of serious tree diseases common to the older plantings in Malaya and it would be a mistake to risk importing them.

Where Philippine Rubber May Be Grown

The best rubber lands of the Philippines center in and about the great forested island of Mindanao, the second largest of the Archipelago and some 500 miles south of Manila.

According to P. J. Webster, horticulturist of the Department of Mindanao and Sulu, rubber may safely be grown in Mindanao south of a line drawn from Baganga on the east coast of the island to Cagayan on the north coast, in Basilan, in the Sulu Archipelago, and on the southern half of Palawan. Owing to the prevalence of typhoons the islands to the north of Mindanao are unsuited to rubber growing and would be foredoomed from the start.

Except for this danger experts assert that the larger island of Luzon, say to 16 degrees north latitude, is as suitable for Hevea in respect to soil and climate as Malaya. Albay, for example, has a very abundant and well distributed rainfall averaging considerably over 120 inches, good soil, and high humidity.

Mindanao an Ideal Rubber Country

Mindanao is an ideal rubber country in the center of the "rubber belt," about six degrees north latitude. It is a tropical empire of 36,292 square miles, large enough to accommodate the whole American rubber trade and still leave room for cacao, coconuts, and other valuable products.

This great island is outside the typhoon belt, heavy windstorms being unknown. Its climate is warm, fine, and healthful for white men. The annual rainfall, according to Weather Bureau statistics, ranges from 73 to 95 inches, with an average of 87, and is well distributed throughout the year. Only a day or two annually is lost because of rain during the morning tapping hours. High humidity resulting in heavy dews is equivalent to additional gentle showers, and plantation records in various localities show yearly rainfall averages over 100 inches, some as high as 150 inches, rain falling on an average of 153 days a year.

Public land unsurpassed in any rubber growing country can be leased by an individual or corporation for twenty-five years, with a twenty-five year renewal privilege, the leasing cost being ten cents an acre per year. A corporation may purchase land if de-

sired by advertising and submitting bids. Generally the price is the minimum of $2 an acre with five years to complete payment.

A single individual or corporation is limited to 2,500 acres, which is not enough to interest some of the large American rubber goods manufacturers, yet it means 300,000 rubber trees which would produce over 1,000,000 pounds of rubber in less than ten years.

Hevea Showing Tapping Surface

Present land laws ought to be liberalized to permit larger holdings and longer lease tenures. Meanwhile, however, a company might arrange with various individuals to obtain adjacent tracts and then take long-time leases thereon.

Taxes are moderate; the government is stable; life and property are safe. Communication and transport are excellent. There are telephones and wireless telegraph stations in the principal towns, steamers to all ports.

Labor may be had for 30 to 60 cents a day, dependent on the age, sex, or repatriation costs as in other rubber countries. The government maintains a Labor Bureau and transports workment at small cost wherever wanted. Properly managed, native labor is more efficient than that, other than Chinese, employed in Malaya. Most of the natives quickly become expert tappers, a day's work for one man on the "Basilan" estate being 400 trees. Tappers have even been assigned 600 trees to a section, doing the work well, collecting their rubber and washing their cups.

Records of rubber growing under various conditions, covering more than ten years, demonstrate that in Mindanao Hevea grows sturdier and reaches tapping size more quickly than elsewhere.

Filipino and Yakan Bringing in Latex

Average trees three years old attain a girth of 18 inches three feet from the ground. Records covering several thousand trees four years old during the first year of tapping, one cut daily one-third section to the left, show an average yield of over 1½ pounds of first quality dry rubber per tree. Bark renewal is all that can be expected.

Soil and climatic conditions are equally good on Basilan Island. There is room for scores of plantations as large or larger than "Basilan." The local seed supply is adequate and plenty of labor can be obtained from Cebu and the other nearby Visayan Islands.

Land Suitable for Rubber Growing

Thousands of acres of alluvial soil are available in the river valleys, also still more gently rolling plateau land some 200 feet above sea level having a layer of rich brown loam resting on a bed of reddish clay. The land best suited and most available for rubber growing is known as secondary jungle. While not as fertile as virgin jungle land it is more easily cleared and free of *Fomes lignosus*, a parasitic fungus which develops on jungle stumps remaining after clearing the land and which invades the Hevea. Jungle land must be cleared, all stumps removed and burned with the tree trunks during the dry season. The land is then well plowed and patani bean, *Phaseolus lunatus*, or other cover crop is planted to enrich the soil until the rubber trees in weeded circles or strips reach an age of three or four years when the patani dies out, and occasional cultivation will keep down the ever diminishing growth of weeds.

Cost of Starting a Plantation

Experts estimate that under modern efficiency methods Hevea rubber can easily be grown at a cost below 25 cents a pound; probably as low as 20 cents. The estimated cost of bringing 2,500 acres of rubber into production, excluding New York charges, extraordinary welfare work, and assuming that this area will be put under cultivation within two years, is $500,000, or $200 an acre. This includes the factory and machinery, steam or hydro-electric, with washers, macerating, crêping, and finishing mills, drying system, smoke house, saw mill, box factory, repair shop, plantation store, storehouse and wharves. Such a planta-

Bureau of Agriculture, P. I.

Hevea, Three Years and Nine Months Old, Balactasan Estate

tion should produce from four tons in its fifth year and 200 tons in its seventh year to 1,000 tons in its fifteenth year and have an increasing production at the rate of about 100 tons a year.

Handling Stores and Store Records in Rubber Factories

The Stock Ledger—Requisition and Receipt Forms—Handling Materials—Storeroom Layout—Inspection

IN many industries the proper control over the tool supply is vastly more important than control over rough stores or raw materials. In the rubber industry, however, the raw materials are the principal items kept in stores, which require close supervision and adequate records to prevent inflated inventories and interrupted production. In the tire manufacturing field, where the materials are fewer in number and more bulky, the problem is much simpler than in footwear manufacturing, for example, where the number of small units is very great.

As in any business, the rubber factory executive who has at his command an accurate up-to-the-minute record of the balance on hand of every kind of material used, the amount consumed from day to day, the amount ordered and in transit, has one of the requisites necessary for the successful conduct of his business. If he has the information and it turns out to be inaccurate, it is worse than useless.

KIND Breaker fabric-60 in. **UNIT** Lb. **PRICE** .55 .53

PURCHASED FROM Southern Mills **WHERE USED** Tires

Purchase Order	Date Amount	Bill of Lading	Received	Our Lot No.	Date	Amount	$	Issued	$	Balance	$
6954	10/15 1,000 lbs. @ .55	10/25	11/4	294		1050	577.50			1050	577.50
					11/6			250	137.50	800	440.00
					11/10			270	148.50	530	291.50
					11/14			260	143.00	270	148.50
6961	11/11 2,000 lbs. @ .53	11/15	11/20	301		2230	1181.90			2500	1,330.40
					11/21			270	148.50	2230	1,181.90

Combination Stores Ledger and Purchase Record Showing Typical Entries and Extensions

The Stock Ledger

The stock ledger, which is usually kept in loose-leaf form, shows the kind and classification of material, the firm from whom purchased, the unit of measure such as yard, pound, gross, the price per unit, and the place where used. Separate columns show the date, amount received, amount delivered, balance on hand, with the money transaction in adjoining columns. Goods ordered with purchase order number, and goods in transit (entered from bills of lading) are also shown in separate columns.

To keep this record accurately requires considerable accuracy on the part of the storekeeper and some executive supervision of the records. The usual system is to have a copy of all purchase orders sent to the receiving clerk. As the goods are received, he checks the amount and forwards to the stock ledger clerk a receiving slip which is in turn checked against the bill for the goods and the entry made on the ledger. When the foreman of any department wishes to draw materials he forwards to the storekeeper a signed requisition for the kind and amount. The storekeeper makes the extension of the amount issued and forwards the requisition to the ledger clerk, who enters it in the "amount issued" column.

If these transactions were faithfully performed in every instance and there was no shrinkage or difficulty in checking units, the balance would be right 100 per cent of the time. But shrinkages in stores are bound to occur from various causes. Rubber gains and loses moisture. Finely powdered drugs leak from bags, barrels, and casks, and lose weight. Moisture and stretch cause variances in cotton whether it is measured by the pound or by the yard. These differences on each transaction are very slight, but when allowed to accumulate, the aggregate makes the records very inaccurate.

To make each item tally without the expensive and troublesome process of taking a physical inventory, some mills make a practice of giving each consignment of goods received a lot number. This number is entered on every filled requisition, and "All out of lot 296" is written when a certain shipment is used up. If the stores ledger still shows a slight balance on this particular lot after deducting the requisition or if there is not enough to cover the amount of the requisition an adjusting entry is made to cover the difference, which is probably very slight. In this way every item is constantly checked up and the accounts are accurate. Physical inventory of items which show a small balance is also good practice.

A stock ledger form which contains all the information enumerated above may probably be objected to by the accountants, but in the case of a small concern it saves much clerical labor and promotes efficiency in the purchasing department. You can perhaps imagine the situation when a purchasing agent of a small tire company, for instance, has a chance to purchase some breaker fabric and wishes to know how he stands on this article. He first looks through his purchase orders to find out what he has already bought, then consults his bills of lading to find what is in transit, and finally his stores record for present balance and consumption. With this stock ledger form he can get all this information at one glance.

Receiving and Checking Materials

The storekeeper's first responsibility is the receipt and checking of goods. To avoid disputes and to insure accuracy, it must be made an ironclad rule that no material or incoming goods of any kind be received by anyone but the storekeeper, who makes a record giving the description of the article, the date, how transported, and the amount. This record is usually made on a specified form in triplicate, one copy for the storekeeper's files, one for the purchasing department, and one for the stock ledger clerk.

The storekeeper's office is usually located at the receiving entrance, which is equipped with two pairs of platform scales, one for weighing heavy items, another for smaller ones. Some purchasing agents do not enter the amount ordered on their duplicate purchasing orders, to insure that the receiving clerk checks the quantity received. This is not always the best practice, however, as most bales, bundles, etc., are plainly stenciled with the quantity. It is not always possible to check quantities.

The stores building should be so arranged that a cool dark place is available for the storage of rubber. Before crude plantation or wild rubber is placed in stores it must be weighed, then the cases removed and the tare checked. It is placed in stores by separate lots, each one numbered, so that it can be readily identified according to laboratory tests. It frequently happens that the mill room draws rubber from stores, using two or three different lots at the same time. This precludes any necessity for the application of the two-bin system in handling this commodity.

In storing cotton goods, the bales or rolls should be set on skids to prevent dirt from the floor seeping through the coverings. Care should also be taken to keep the goods away from windows or openings where moisture is liable to get at the goods and cause mildew. Dyed goods should be kept out of the sunlight. Light weight sheetings and ducks are purchased by the yard, and while the number of yards is usually marked on each piece, the measuring and drying machines will stretch the pieces several yards. Thus in requisitioning cotton sheeting, for example, the stores records would be inaccurate unless the original marked

REQUISITION FOR { MATERIAL / SUPPLIES

DEPT. Mill

DATE Nov. 25/22 NO. 7500

Quantity	Description
500 Lbs.	Ribbed smoke sheet Lot 901 SIGNED: HARRINGTON

	EXTENSION		
Quantity	Unit	Price	Amount
510	lb.	.155	$79.05

Entered	Store's Ledger	Stock Ledger	Cost Dept.
√	√	√	√

Typical Stores Requisition With Extension Filled Out

yardage of each piece is used as the measurement. On tire duck which is purchased by weight, care must also be taken to enter the original billed weight when taking it from stores, not the weight after drying, which will be about 5 per cent less.

In storing compound ingredients such as whiting, zinc oxide, etc., it is common mill practice to deliver to the compound room in the original containers, as rehandling of this class of material is not only wasteful but very dirty. To insure accuracy of records each bag or barrel should be stenciled with the original weight as it is received, and this weight entered on the requisition when forwarded to the ledger clerk.

RECEIPT OF GOODS { RAW MATERIALS / SUPPLIES / RETURNED MERCHANDISE

FROM James H. Bradbury & Son
Akron, Ohio

No. 296547 DATE Nov. 25/22

Via	Freight √	Express	Parcel Post	Electric Freight
	Our Truck	Their Truck	Messenger	

Quantity		Description	Purchase Order No.
Lbs.	Yds.	Combed Sea Island Cord Fabric	9654
224	132	Style 427 60"	Nov. 1, 1922
227	134		
223	130		
221	129		

SIGNED: WILLIAMS

Receipt for Goods Filled Out With Typical Entries

Storeroom Equipment

The stores department should be equipped with a special storeroom laid out with bins for numerous small articles. In the tire and tube factories, tube valve parts are stored in this manner: in footwear; thread, grommets, hooks and ladders, buckles, eyelets, laces; in mechanicals, various hose accessories such as clamps, nozzles, brake hose fixtures; in druggists' sundries, hot-water bottle stoppers, eyelets, etc. Then there is still another class of stores, classified in the army as non-accountable, such as brooms, brushes, knives, rollers, stitchers, cups, and pans. Departments should be placed on a budget for this class of items, otherwise there will be unwarranted consumption. Even such a small item as pencils, if not controlled and watched, will run into sizable figures. Some plants operate on the system that the wornout article must be turned in before a new one is issued, and find it a very effective way of checking misusage of accessories.

If the storekeeper is alert, he can save considerable money in depreciation of stores by seeing that the oldest materials, where practical, are used first, and by turning over to the salvage department obsolete materials.

Every rubber factory, no matter how small, is equipped with a machine shop and carpenter shop. These departments must maintain a small storeroom of their own, or have a special storeroom under the control of the storekeeper. Nails, screws, bolts, window glass, paint, pipe, lumber, electrical supplies, bulbs, are among the items it is necessary to keep on hand.

Cartons and shipping cases, if not manufactured on the premises, must be kept in stock. These are used extensively in the manufacture of inner tubes, footwear, rubber heels, and druggists' sundries. Tire-wrapping tape, separator paper, wrapping paper, and stationery belong in this group of materials. They must be stored in a dry, clean place, as dirt and moisture will cause these goods to depreciate very rapidly.

Storeroom Lay-Out

In planning a lay-out of a storeroom it is advisable to store the rubber in the basement or lower floor. This makes it more accessible to the calender department and makes it easier to keep out the light. Cotton goods can be stored on the next floor, adjacent to the drying department. Compounding ingredients can be located on the third floor next to the sifters and chutes. Small stores should be readily accessible and can be placed on the same floor with the cotton goods. Paper cases, wrapping paper, and miscellaneous goods which are stored up ahead can be placed on the top floor where they will be free from dust and dirt.

Convenience of location of the various items depends a great deal on the lay-out of the rest of the factory, however. A detailed index showing the exact location of each kind of stores should be posted on each floor and in the receiving office to save time in handling the goods. The entire building should be kept under lock and key, with one man, preferably the receiving clerk and storekeeper, responsible for the stores. For his position is exactly the same as a bank cashier's, except that he handles commodities purchased with money instead of the actual money itself.

Inspection

A careful inspection should be made of all goods on receipt to see that they are in good order, for claims for damage in transit should be made immediately. Cord fabric is very apt to get damaged in transit, as the slightest bruising will break the filler threads and cause considerable loss. For this reason this class of goods is plainly marked "Lay Flat." The use of hooks on bales of cloth and knitted fabrics will cause damage, and a leaky freight car roof will rot and mildew cotton. All these points must be watched for with thoroughness.

An efficient stores organization operating in close cooperation with the purchasing department insures a supply of the proper raw materials at the right time. This means a great deal in the mill as it eliminates the hurried workmanship caused by trying to make up time lost waiting for materials, and enables the productive element to be concentrated on quality, free from worry as to the sources of supply.

In plants where a planning department is functioning properly advance information on orders and sales is placed in the hands of the purchasing and stores department in time to insure ordering of supplies.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(151) A reader asks for names of manufacturers of machinery to finely grind waste rubber.

(152) Inquiry is made for addresses of dealers in colors suitable for use in hard rubber goods.

(153) A reader desires information concerning machines for branding certain types of hose.

(154) Request is made for the address of the manufacturer of the "Soleurown" sole.

(155) A list is desired of manufacturers of ultramarine blue, and of importers of this material. Information is also desired as to miners of Peruvian ochre.

(156) We are asked for names of manufacturers of flexible rubber varnish.

(157) A subscriber wishes addresses of users of balata resins.

(158) We are asked for addresses of golf ball manufacturers or others who deresinate Pontianak.

(159) Information is desired as to where slate flour can be obtained.

(160) Addresses of firms supplying palm oil are asked for.

(161) Inquiry is made for sources of supply of uncured tire friction.

(162) A reader wishes to know where dieing out blocks may be obtained.

(163) Addresses are desired of makers of machines for cutting bevelled jar rings.

Foreign Trade Opportunities

Addresses and information concerning the inquiries listed below will be supplied to our readers through the Foreign Trade Bureau of The India Rubber World, 25 West 45th street, New York, N. Y. Requests for each address should be on a separate sheet and state number.

(5078) Tires of the best grade—Austria. Quote f. o. b. New York. Agency.

(5083) Rubber combs—Sweden. Agency. Quote f. o. b. New York.

(5085) Machinery for repairing and reinforcing automobile tires—Spain. Purchase. Quote in Spanish, f. o. b. New York.

(5086) Sport shoes of all kinds—Norway. Agency.

(5094) Tires—Morocco. Agency. Quote c. i. f. Moroccan ports. Cash against documents.

(5130) Tires, including solid tires for trucks—Italy. Agency.

(5138) Tires—Turkey. Agency. Quote c. i. f. Constantinople. Cash against documents.

(5141) Rubber overshoes—Norway. Agency.

(5153) Vulcanizing machinery of medium price—Hungary. Purchase and agency. Quote c. i. f. Hamburg. Cash against documents.

(5174) Rubber goods, oilcloth and linoleums—Italy. Purchase.

(5189) Men's wear, including garters and suspenders—Colombia. Purchase.

(5195) Standard tires, tubes, and full line of accessories—Hungary. Purchase and agency. Quote c. i. f. Hamburg. Cash with order.

(5207) Tires, metric measurements, of good quality—France. Agency. Quote in French, c. i. f. customs paid. French port.

(5212) Tire repair materials—Turkey. Purchase or agency. Quote c. i. f. Turkish port. Cash against documents. Descriptive literature desired.

(5228) Tires, clincher type preferred, and accessories—Hungary. Agency. Quote c. i. f. Hamburg.

(5256) Rubber goods—Spain. Agency.

(5333) Druggists' rubber goods of all kinds—Spain. Purchase. Quote in Spanish, c. i. f. Spanish port.

(5337) Rubber heels for men and women—Cuba. Agency. Quote f. o. b. New York.

(5348) Rubber combs—Sweden. Agency. Quote c. i. f. Swedish port.

(5353) Tires, tubes, and accessories—Ireland. Purchase.

(5378) Pneumatic tires in millimeter sizes only—England. Purchase. Quote f. o. b. New York.

(5395) Technical rubber goods—Netherlands. Sole agency. Quote c. i. f. Netherlands port. Cash against documents.

(5400) Tires of best quality, metric and inch clinchers—Hungary. Agency. Quote c. i. f. Hamburg. Cash against documents.

Trade Lists Available

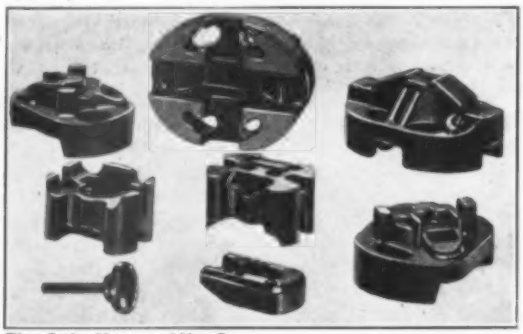
Mimeographed copies available on reference to titles and file numbers.

Rubber goods, importers and dealers, Scotland, BE-4006.
Rubber goods, importers and dealers, Spain, EUR-11036.
Rubber goods, importers and dealers, Nicaragua, LA-27011.
Rubber goods, importers and dealers, Mexico, LA-30050-A.

Cold Molded Hard Plastics

General Characteristics and Applications—Molding Equipment and Processes

IN the molded insulation field the class of materials known as cold molded hard plastics, commercial development of which began about 1907,[1] is of great and increasing importance. In volume of production and variety of application these products



The Cutler-Hammer Mfg. Co.

Fig. 1. Cold Molded Products

rival those of molded phenolic resins, due to their superior resistance in withstanding higher heats and to their cheapness.

Properties and Applications

Cold molded products are black or brown in color, take a high polish, do not warp, shrink, expand or soften when subjected to temperatures ranging from 30 degrees below zero F. to 600 degrees above. They are waterproof and highly resistant to atmospheric agents and oxidation. Of a particular brand of cold

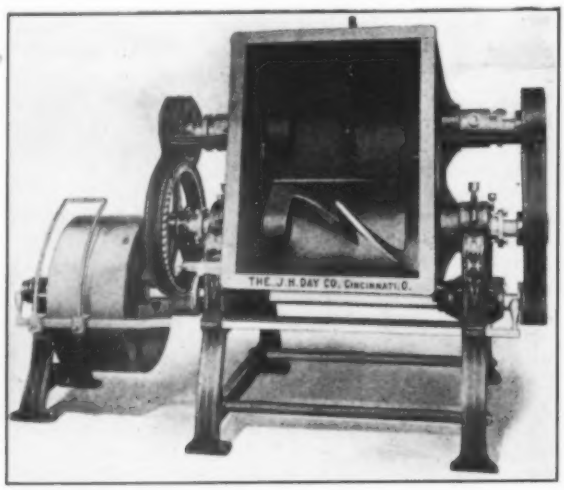


Fig. 2. The Day Mixer

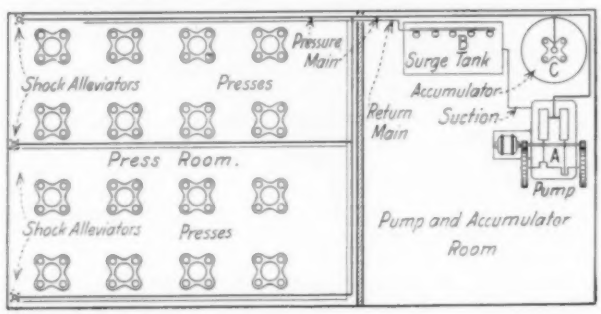
molded insulation it is claimed that it is capable of withstanding temperatures of 1,100 to 1,400 degrees F. and maintain its shape.

Some of the uses of such material are as electric toaster stove bases and supports, motor terminal blocks and covers, switch and rheostat bases, magnetic switch blow-out shields, switch barriers, etc. A group of objects is shown in Fig. 1 illustrating some complicated cold molded insulation applications.

Appearance and Composition

The cold molded products of different manufacturers are known by special trade names but their composition and general characters are much alike. Each manufacturer has his special preference for some binder or combination of binders. Cold molded articles do not possess the high luster of hot molded shellac or phenolic resins, caused by fusion of the binder, and are simply buffed and polished.

In composition cold molded products consist of inorganic filling materials and partly carbonized organic fillers. The filling materials comprise asbestos fiber, infusorial earth, silica and magnesia compounds. The binders are commonly hard asphaltic bodies, either natural or oil derivatives, coal tar pitches, stearine pitches, residues derived from distillation from oils and fats, a



Watson-Stillman Co.

Fig. 3. Cold Molding Press and Pump Room

variety of solutions of gums, resins, oxidized oils, wax compounds, etc.

The filling materials are chiefly asbestos fiber, infusorial earth, silica, and magnesia compounds.

Manufacturing Process

The first step in the preparation of a cold molding plastic mass consists of reducing the solid binding materials to a suitable liquid or semi-liquid consistency by such solvents as coal tar oils, petroleum oils, drying oils, benzine, turpentine, etc. For this work a mixer of the type shown in Fig. 2 is employed, which may or may not be arranged for heating the materials. The same sort of mixer is also used for incorporating the mineral fillers with the binders into a mass of suitable plasticity for the molding process.

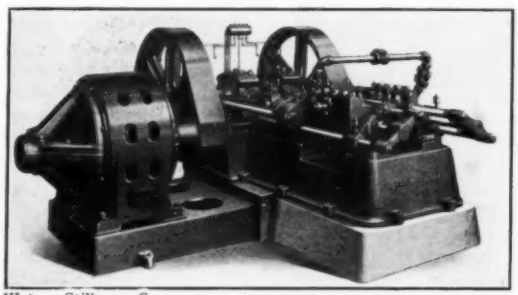
Mixing without the aid of heat is the usual rule but heat is sometimes applied to hasten the mixing process or to drive off such solvents as are not easily volatilized or oxidized during mixing. When completed the mass of mixed ingredients has the granular consistency of damp sawdust and must be in such plastic condition as to be moldable in closed or plunger type molds into more or less intricate shapes. If the mixture lacks in plastic quality it will be either too difficult to mold, produce porous articles, or not be moldable at all. If the material is too plastic the proper consistency cannot be obtained in the molds and the resulting piece will not be removable from the mold in perfect condition.

The importance cannot be overemphasized of proper prepara-

[1] Plastic and Molded Electrical Insulation. By Emile Hemming. The Chemical Catalog Co., New York, 1923.

tion of the molding mixture to the correct degree of plasticity favorable to perfect molding. In this respect the cold molding process presents a difficult problem unlike that met with in molding shellac or phenolic resin products, where the molding mixtures are plasticated by heat from the dry state.

In the cold molding process the binder cannot be in a dry state but plastic. It cannot be exposed too long to dry atmospheric conditions. In that case the binders are apt to harden to such a degree as to be unsuitable for molding, due to evaporation or oxidation.



Watson-Stillman Co.

Fig. 4. Motor Driven Hydraulic Pump

Molding Equipment

A typical plan of hydraulic equipment as installed for cold molding is shown in Fig. 3. The arrangement consists of a pump and accumulator room in which is installed the hydraulic power system for operation of the presses arranged in lines in the press or mold department. In the pump room are located a motor driven pump A, shown in detail in Fig. 4. The pump connects with a surge tank B and weighted accumulator C. The hydraulic power is conveyed to each line of presses by branch pipes from a main extending across the room at the end nearest the pump room.

Each hydraulic branch line is controlled by a stop valve and at its furthest end is fitted with a shock alleviator (See Fig. 5). The shock alleviator is used in connection with any accumulator service to relieve the piping and other parts of the line from the heavy shock caused by a sudden closing of a valve. It comprises a piston of moderate size, spring loaded to about accumulator pressure. When a stop occurs the springs raise enough to ease the shock and prevent damage.

In situations where it is not desirable to use either a weighted or steam loaded accumulator, as for instance inside a light building, on an upper floor, or for semi-portable outfits, the hydropneumatic accumulator pictured in Fig. 6 may be used.

The outfit includes a hydraulic pump, the accumulator proper, which consists of two differential cylinders, the small cylinder A being connected with the pump discharge, while the other cylinder B is connected to the third element, a heavy air tank C, and lastly a belted air compressor D with which to obtain any desired initial pressure or replace any loss from leakage by air.

Cold Molding Presses

A typical press used for cold molding is that illustrated in Fig. 7. In this form the platen is pulled back by a small hydraulic cylinder A superimposed upon the main cylinder B. It is guided on the rods by babbitted bearings to insure uniformly parallel motion. Tee slots are placed in the platens for holding the dies. A hydraulic plunger in cylinder C works through a hole in the center of the bottom platen for ejecting the material from the dies. The main moving platen and ejector are both operated by a single lever quick acting balanced spindle valve.

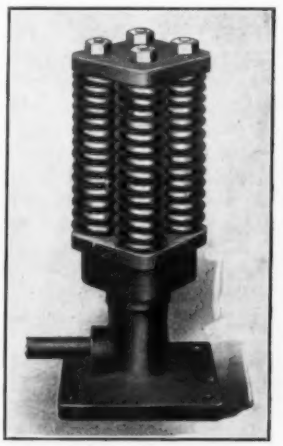


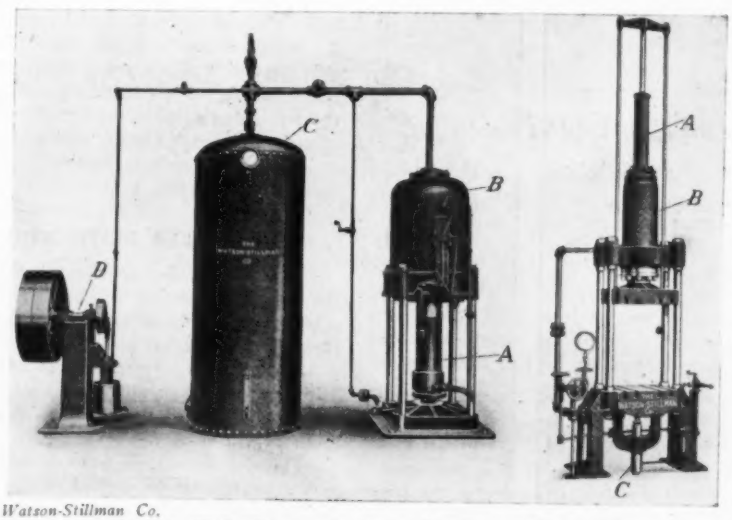
Fig. 5. Hydraulic Shock Alleviator

Cold Molding Process

The inventor of cold molding, in the book already referred to, has recorded comprehensively the various stages of the process of cold molding from which the following condensed account has been written.

The amount of fine granular molding mixture necessary for each molded piece must be weighed or measured accurately. In the latter case it may be done by designing the mold case or chase of sufficient height to hold exactly the necessary volume of mixture to form the molded piece of exact dimensions under full molding pressure.

Hand operated scales are most common at the present time although automatic weighing machines are also being used, the advantages of which are partly offset by drawbacks not met with in the hand weighing method. Automatic methods for mold filling and press operating have been desired but such methods are deemed rather too advanced for general adoption in the present state of the industry. However, future developments are quite probable.



Watson-Stillman Co.

Fig. 6. Hydro-Pneumatic Accumulator

Fig. 7. Reversed Cylinder Die Press

Molding Pressure

A pressure of from 2,000 to 5,000 pounds per square inch is necessary for compacting the plastic mixture and filling all the details of the mold. Usually a flat shape requires much greater pressure than an irregular one. The variation in the consistency of the molding mixtures and the construction and design of the molds influence the amount of the molding pressure required.

The pressure in molding is not a single push but a succession of pushes, but not impacts. The molding cycle is very brief, so much so that single cavity molds can be used for large production.

Heat Treatment

After the molded articles are formed they are conveyed to heating ovens of the type used for enameling, represented in Fig. 8. Here they are thoroughly baked for 24 hours more or less until they attain freedom from all trace of solvents used in mixing the ingredients and gain increased hardness and permanence of composition and infusibility of binder.

In ovens of this type heated by means of superheated steam, gas, coal, or electricity, the molded pieces are held for a number of hours to bake, dry, oxidize, or polymerize the compressed material. The temperature required for this heat treatment is dependent upon the character of the binders used in compounding the mixtures and the time is governed by the thickness and shape of the article. So far the heating methods employed are without standardization and depend on the ideas and experience of individual manufacturers.

The vital feature in this operation is to heat the molded material to the proper condition and degree so that all its volatile

E. E. Steiner

Fig. 8. Oven for Baking Cold Molded Articles

components are driven off, its drying constituents so oxidized, or the polymerization of its chemical action stopped at the point where the material has become hard and cannot soften.

The necessity of the heating operation has one distinct manufacturing disadvantage not occurring with shellac or phenolic resin molded products. This disadvantage is the shrinkage and warping in the finished product, varying from 0.002 to 0.020 per inch according to the shape and design of the piece. Allowance is made in designing molds to compensate for this shrinkage and warping and thus eliminate practical difficulty.

Wear of Molds

The heavy pressure required for molding cold molded insulation and other articles develops abrasive action due to the large percentage of such mineral fillers as asbestos and silica present in the mixtures. Certain parts of the molds and even entire dies wear out under the cold molding process and require replacement sometimes after only 10,000 or 20,000 moldings, while others last through as many as 50,000 to 100,000 moldings. The longer the dies are used without being renewed the less perfect and accurate the molded product will be. The surfaces of the plungers and mold casings wear to cause uneven surfaces and burrs which necessitate costly finishing operations on the hardened objects after the baking operation.

The finishing operations are a serious factor in regard to appearance of the final product as well as the cost of the goods. The finishing is effected as in the case of molded hard rubber, by well known power buffing and polishing means, to which further reference need not be made.

RUBBER RESTRICTION PROBLEMS

In a recent editorial entitled "Rubber Restriction Problems" *The Financial Times*, London, England, comments on the fear of the United States of a serious rubber shortage toward the end of 1923, if the present rubber restriction scheme is maintained. The editorial states:

"The position has been rendered considerably worse by the fact that the average price for the three months to the end of January was not up to 1*s*. 3*d*. per pound. If this average price had been attained during the last quarter the percentage allowance would have been 65 instead of 60 for the next three months. Then, if the average price to the end of April had been 1*s*. 6*d*, another 10 per cent would have been added, and for May, June, and July the export percentage would have been 75, while, presuming the price were maintained, the figure for the closing three months of the rubber year would be 85 per cent. The best that can now happen, from the manufacturer's point of view, is that the percentages for the three remaining quarters of the year shall be 60, 70, and 80, and that is contingent upon the price remaining steady at or over 1*s*. 6*d*. per pound.

"Actually, the percentage of the standard which would have been allowed had the prices averaged 1*s*. 3*d* for the first quarter and 1*s*. 6*d*. thereafter would, taking each quarter as equal, have worked out at 71.25 per cent of the standard for the year, while all that can now be secured for the full year is 67.50 per cent.

"Following the same calculation it will be seen that the full 100 per cent cannot be attained provided the scheme is not modified until the April-June period, 1924. As already stated, this is provided that the average price does not fall below 1*s*. 6*d*. for any subsequent quarter."

Attention is also called to the vagueness of the Stevenson Committee's report as to what will happen when the 100 per cent of the standard has been released. With the probable output for 1924-25 considerably larger in many cases, it is questioned whether restriction should automatically come to an end when the quantity released is equal to the "standard," meaning the actual output of each producer during the twelve months ended October 31, 1920, or whether it should be continued by the regular percentage increases or decreases.

RUBBER RESTRICTION UNCHANGED

The Colonial Office announces that there will be no change for the quarter beginning February 1, 1923, in the percentage of standard production of rubber that may be exported at the minimum duty in Ceylon and the Federated Malay States.

The Stevenson scheme now in operation provided that at the initiation of the plan the percentage of standard production of rubber exported at the minimum duty should be 60.

As explained by Major Ormsby-Gore, the under-secretary for the Colonies, the market price of rubber is the determining factor in the scheme for the control of the supply of plantation rubber. When rubber averages a price of 1*s* 3*d* or over, but not so much as 1*s* 6*d* per pound, during any of the quarters ended January 31, April 30, July 31, October 31, the percentage of its standard production of rubber that an estate may export on the minimum duty is to be increased by 5 per cent per annum for the next ensuing quarter. If the average price during any such quarter is 1*s* 6*d* per pound, or over, the percentage per annum is to be increased by 10 per cent for the next ensuing quarter. It is calculated that a 10 per cent rise is equivalent to an increase of 31,000 tons. This system is felt to be sufficient safeguard against the price of rubber rising to an excessive figure under the scheme for the restriction of export.—*Financial Times*, London.

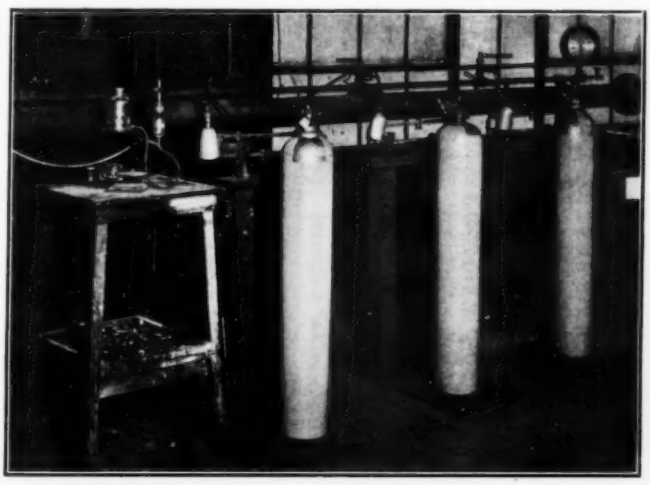
The Use of Carbon Dioxide in Air Bags

Nature, Manufacture and Use of Carbon Dioxide—A Non-Oxidizing Atmosphere for Inflation of Air Bags

By Henry R. Minor[1]

THE inflation of tire casings in molds by means of air bags is the method universally adopted for curing tires under internal pressure. Air has been the inflating medium regularly used, notwithstanding the fact that it exerts a serious deteriorating influence by reason of its oxidizing effect on the hot rubber of the curing bag during vulcanization. This influence is so marked that the life of air bags is frequently very short, resulting in high cost of air bag per tire cured.

Much has been accomplished by skillful compounding to reduce the loss by air bag oxidation, but it is only within a couple of years that the logical method has been used of employing a harmless inert gas in place of air as the inflating means in the air bag method of cure. The gas selected for this purpose is carbon dioxide (CO_2). The theory relating to the advantages to be obtained by its use have long been familiar to rubber chemists. The lack of general information relative to the availability, price, and means of distributing and using the gas in cylinders under pressure is chiefly accountable for carbon dioxide not being earlier used in tire vulcanization.



General Carbonic Co.

Fig. 1—Filling Carbon Dioxide Cylinders.

The practical advantages and economy of its use already demonstrated are still further emphasized by the recent steady advance in the prices of crude rubber combined with a reduction of ten per cent in the price of carbon dioxide. For the benefit of non-chemical rubber men it is necessary to state a few facts with regard to what carbon dioxide is, its properties, and the method of commercial production.

Carbon Dioxide

Carbon dioxide is an odorless, colorless gas, one and a half times heavier than air, in which it is present in the open to the extent of three to four parts in 10,000, and this small percentage is of fundamental importance in nature. In some localities it escapes from the earth in great quantities, and many springs contain it in solution. It is a product of the oxidation of all organic matter, and is therefore formed in the process of combustion, as well as of decay. It is exhaled from the lungs of all animals in respiration, and is a product of many fermentation processes. It is required for the growth of all plants.

Among the uses for which carbon dioxide is now employed in large quantities are: As a preservative in the canning industry; in the manufacture of carbonated drinks and soda water; and in refrigeration, because of its safety from risk of fire and explosion; and for extinguishing fires.

The commercial production of carbon dioxide is based on the fact that it is a product of combustion. Briefly, the method of obtaining it consists in burning coke, the heat of which is utilized for power, in furnaces designed for as near perfect combustion as possible. The resulting flue gas is found to contain from 18 to 20 per cent of carbon dioxide, which is recoverable in a series of apparatus as pure gas.

Carbon Dioxide Recovery

Flue gas from coke burning is scrubbed in coke filled towers by passing upward against a descending water an alkali to remove impurities; thence the gas traverses absorption towers in which the carbon dioxide is taken up by an alkali from which it is subsequently expelled by boiling. The separated gas finally reaches the header at the cylinder filling stands, cool, dry, and compressed under 1,000 pounds pressure per square inch.

The arrangement of the filling stand is shown in Fig. 1. The gas is tested for purity at this point, air being the chief impurity and is found to test from 99.5 to 99.9 per cent pure carbon dioxide.

During filling each shipping cylinder stands upon a scale platform and receives a definite poundage of gas, usually 50, under 850 pounds pressure per square inch.

Utilization in Tire Vulcanization

The deterioration of the air bag in which air is used is due chiefly to the progressive oxidation of the rubber molecule with each successive cure until in a short time the rubber loses its elastic quality and breaks under the strain of inflation. The substitution of carbon dioxide for air as the inflating medium supplies an atmosphere which prevents oxidation.

The only air then available for oxidation is that entrained in the body of the rubber in the course of its manufacture, which is entirely negligible. In fact, since rubber is permeable to carbon dioxide, its non-oxidizing influence is obtained in some degree in the rubber of the bag, although the maximum effect is on the inside of the bag. Practical experience shows that the use of carbon dioxide in place of air will double the life of an air bag.

Inflating with Carbon Dioxide

When used in a small way a couple of cylinders may be strapped on a truck as shown in Fig. 2, and equipped either with an ordinary pressure or a regulator gage and hose connections, and may be pushed along the aisles to points needed, where by means of the valve the operator gives the bag the desired pressure.

Battery Inflating System

In the battery system of inflating, illustrated in plan in Fig. 3, a number of cylinders are hooked up to a high pressure header,

[1] Development Engineer, General Carbonic Co., New York, N. Y.

one end of which is capped and the other has a large pressure regulator gage which is set at the desired pressure. From this gage a low pressure header is laid past the foot of each aisle

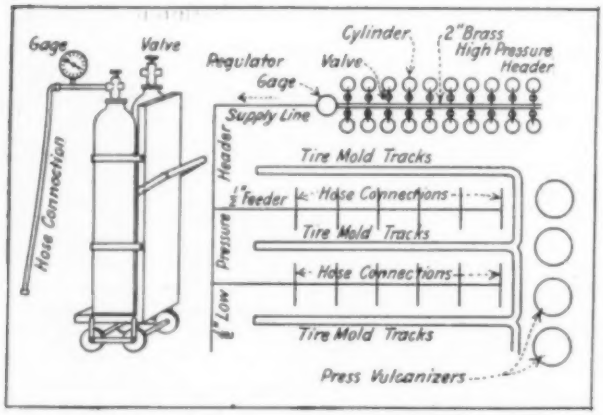


Fig. 2—Cylinder Truck. Fig. 3—Battery Inflation System

while the feeders run up the aisles, with hose connections at convenient points.

When the battery on one side of the header is exhausted the connecting valves are closed and the battery on the opposite side opened, the empty cylinders being replaced at convenience. This method has the advantage of requiring minimum labor, and no trouble is experienced from freezing in the valve cylinders.

Constant Pressure Inflation Method

Where constant pressures are used the conditions are entirely different. In this case it is desirable to recirculate the gas, employing a gasometer and a pressure tank, as illustrated in plan in Fig. 4. The gas from the gasometer is passed through a compressor to the pressure tank and then to the tires in the vulcanizer to be inflated. The pressure is controlled by a regulating valve set at the desired pressure.

After the cure the valve on the pressure line is closed, the valve on the return line is opened and the gas in the bags discharge back to the gasometer. When the desired set pressure is reached on the supply line the regulating valve on the by-pass operates to recirculate the gas around through the compressor.

Gas Containers

The cylinders are exceptionally strong, being regularly tested to pressures of 3,000 pounds, and are equipped with frangible disks so designed as to break at pressures of 2,700 pounds. However, these pressures are never reached in practice, the normal pressure in the cylinder at 68 degrees F. being 850 pounds; and at 120 degrees F., which is about the highest temperature

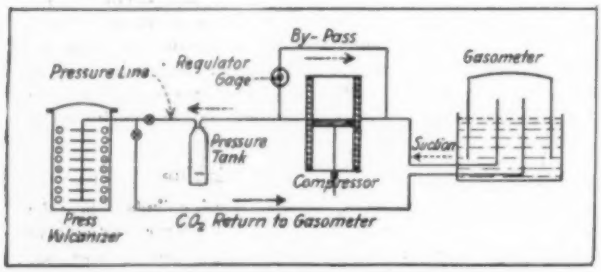


Fig. 4—Constant Pressure Inflation System

that the containers are ever subjected to, the pressure is only 1,550 pounds. Cylinders containing 50 pounds of gas are eight inches inside diameter and 51 inches long, and, including gas, weigh about 150 pounds each.

At 68 degrees F. a 50 pound tube contains 450 cubic feet of gas, and owing to the fact that the gas is in liquid form inside of the cylinder the original pressure of 850 pounds remains nearly constant until practically all of the gas has been drawn off. The relationship between the weight of gas in the cylinder and the pressures at 68 degrees F. is indicated in the following table:

Pounds of Gas in Cylinder	Pressure Pounds Per Sq. In.
50	860
45	850
40	840
35	830
30	820
25	810
20	800
15	775
10	650
5	350
1	80

The cost of carbon dioxide gas varies from seven to eight cents a pound for industrial uses, and the amount used in filling an air bag for a 32 by 4½ shoe would be approximately one-half pound.

The following tabulation of general data relating to carbon dioxide will be of interest to those desiring technical information regarding CO_2.

Specific gravity, compared with air	1.529
Specific heat, at constant pressure	0.2167
Heat capacity of CO_2 per liter	0.433
Wt. of 1 liter of CO_2 at 32° F. and 760 m.m.	1.9768
Boiling point liquid CO_2	109° F.
Critical temperature	88.4° F.

METHOD OF ATTACHING CRÊPE RUBBER SOLES

Heavy crêpe rubber soles have been attached to leather shoes either by cementing or by sewing. Attachment by cementing without stitching has proved a failure in this country although reported a success in England, possibly because the method may be different there. Failure to hold is caused by dust or dirt entering the joint between rubber and leather at a point of faulty attachment, and working its way between the soles, causing separation, till the rubber sole finally flaps off.

The difficulty experienced with stitching through a single unit crêpe sole is that a channel is formed along the line of sewing due to the tension of the thread and causing liability of chewing off the sole, detaching it along the channel. This difficulty has led to the perfecting of a uniformly effective method of attachment, upon which a United States patent has been applied for[1].

The crêpe sole is prepared on the two-unit plan; that is to say, a thin section of buffed crêpe rubber is securely cemented to the split surface of a light leather slip. The combination slip sole is then rough rounded and stitched to the welt of the shoe, water being applied to the rubber before sewing. After thoroughly evaporating the water, the outer section of the crêpe sole is attached by wetting both sections with high grade naphtha or benzol, rubbing the solvent in thoroughly with a stiff brush. Sufficient time is allowed for thorough drying of the solvent, then the outer sole is laid under pressure. Perfect union at the edges is secured by hammering or pinching with pliers if necessary. The heel edge is knifed and scoured. The edge of the welt is trimmed and finished on the edge trimmer, water being applied with a brush to the rubber sole before trimming welt. The edge of the rubber must be scoured or it will not trim. This method gives a stitched-on sole with no stitches showing on the surface and makes the attachment absolutely safe and permanent.

[1] Alfred Hale Rubber Co., Atlantic, Massachusetts.

THE PERFECTION CO., 400 WEST OHIO STREET, FORMERLY AT 2820 South Wabash avenue, Chicago, Illinois, manufactures the "Perfection" automobile curtain windows. Before fitting them into place, it uses an uncured gum tape around the edges of the glass to form a cushion and prevent leakage and breakage.

Non-Skid Tire Tread Design

Planning the Design—Value of Straight Lines—Attractive Appearance Necessary—A Correct Design

By Harry Wilkin Perry

DESIGNING a non-skid tread to meet with the largest measure of success requires more than casual thought. Maximum resistance to skidding tendency may be obtained at sacrifice of durability and silence, or attractive appearance may be lost by too ornate a design or the faulty embodiment of initials.

The principal requisites of a superior design are: Resistance to side slip and spinning; resistance to wear; freedom from suction and noisiness; attractive appearance, and distinctiveness.

No design formed in the tread of a rubber tire will prevent skidding under all conditions. Rubber will slip on smooth ice with a very slight lateral thrust and on a smooth, hard pavement smeared with grease and water the latter act as a lubricant between the tread and the road, thereby destroying the traction.

Under all but exceptional conditions, however, a well-designed non-skid tread is very effective in increasing traction and resistance to slippage.

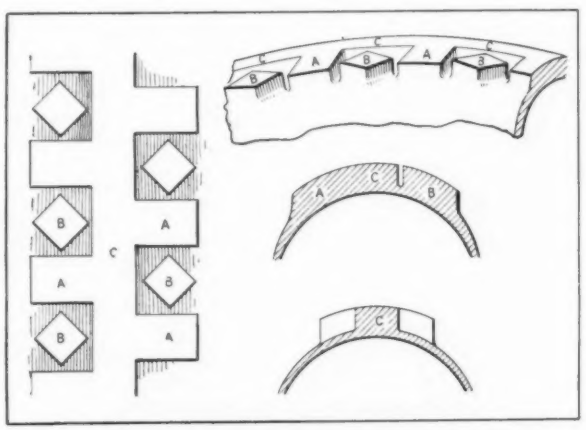


Fig. 1—Principles of Non-Skid Lines and Surfaces

The theory on which the best designs are based is that a well-defined edge vertical to the plane of the road surface tends to scrape water and mud from the surface when a slip starts, leaving the road clean and increasing traction, the action being the same as that of rubber-edged windshield cleaners or squegees used for cleaning plate-glass store windows. A rounded surface tends to slide on top of the coating of slime and to slip on it; thus a smooth-tread tire is ideal for skidding because in effect it presents an inclined plane in every direction from its point of contact, and the angle of these planes to the road is very sharp.

Planning a Non-Skid Design

First, the raised portions of the tread should have straight walls forming approximate right angles with the tread surface so that all edges will be sharp. There are two slipping tendencies to be resisted. One is side slip and the other slippage of the tire in its rotation with the wheel, as in a muddy rut. Side slip may assume any angle within an arc of 45 degrees from the line of motion of the vehicle but is commonly confined to a few degrees from this line and is corrected by bringing the front and rear wheels into alinement by proper steering.

Maximum reduction of side slip tendency may be obtained by forming vertical shoulders at the edges of the raised tread. These may be straight circumferential lines, either continuous or broken; or they may be irregular, forming V-shaped angles. The latter are probably more effective. If the shoulder is straight it is desirable to have other diagonal edges in the face of the tread which will be approximately at right angles to the direction to skid. Resistance to spinning of the wheel in snow or muddy ruts is obtained by depressions with edges at right angles to the direction of slippage.

Figure 1 shows a design in plan, side elevation, and transverse sections that meets these requirements. The transverse edges of the high, vertical side shoulders presented by the rectangular portions A prevent spinning. The diagonal edges of blocks B lie at right angles to the usual direction of side-slip. This pattern is not offered as a very desirable design but merely to illustrate the points mentioned. It would, however, give as good traction under all conditions as most of the non-skid designs in use.

Value of Straight Lines

Straight lines offer better resistance to skidding than curves; hence squares, diamonds, triangles, and angular letters are preferable to circles, scrolls, or curved letters. They are also more appropriate and present a more pleasing appearance.

Resistance of the tread to wear is as important as anti-skid qualities for long-mileage service and is the test of a good tire. Design of the non-skid tread has an important bearing on durability. The aim should be to get as large a bearing area on the raised tread as possible without impairing the resistance to slippage. Given the same carcass construction and identical rubber compound and treatment in the mold, that tread will wear longest that has the largest percentage of bearing surface. Obviously, if more than 50 per cent of the face of the tire is depressed out of contact with the road, the raised portions will wear down faster than if more than 50 per cent is raised.

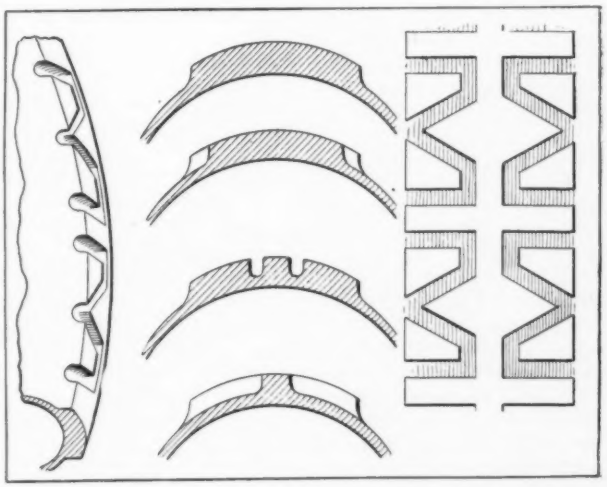


Fig. 2—Initial Letter Design Combining Geometric Figures

Seventy-five per cent can be wearing tread surface without sacrificing too much of the non-skid factor.

Tread bearing surface should be presented in relatively large

areas, and not in thin lines, yet enough space should be left between them, in the depressions, to give the edges a chance to take hold of the road surface. In order to retain the non-skid quality at high efficiency until the tire is worn nearly down to the breaker strip, the recesses must be deep, extending nearly down to the fabric, particularly along the center line of the tire, where most wear occurs. These deep recesses leave the raised portions high, and if the latter are too small in area or too narrow they will bend over easily and not only wear away rapidly but will not present the stiff, sharp edges necessary to resist skidding.

Additional stability of the raised portions can be secured by connecting them with the central portion and together. A thin rib connection is of little value. It must be large enough to brace and support the central strip and the block areas. In Fig. 1 the areas A are thus attached to central portion C, blocks B are isolated and unsupported; but if these have an area of half a square inch or more they will be sufficiently stable to avoid excessive wear.

Continuous Tread Strip

It is well to have a continuous central, circumferential strip or rib flush with the regular contour of the tread. The greatest amount of wear comes at the center of the tread, hence the largest bearing surface should be located there. Such a smooth central strip does not offer any resistance to easy steering, which a broken tread may do.

It is not desirable to have any closed pockets in the design. Suction created by pockets increases adhesion to the road and while very effectual in avoiding skidding it also increases road resistance, causing a drag that absorbs power and raises dust. Also, as the pockets release their hold the air rushing into the vacuums creates a humming or singing noise rising in pitch as the speed of the car increases.

Value of Attractive Appearance

Appearance is an important factor in the salability and popularity of a tire, especially with owners of the better class of cars. For this reason it pays to devote thought to getting a pleasing non-skid design. The practical considerations already mentioned can be combined with an artistic simple pattern.

It may be desirable, for advertising purposes, to incorporate in the design an initial letter standing for the manufacturer's name. Any design, however, that is distinctive, attractive, and at the same time affords a maximum of non-skid security and resistance to wear, has quite as much advertising value as one showing a letter. If an initial lends itself well to the essential requirements of a good non-skid tread, there is no objection to its use, provided it is so treated as to enhance the pleasing appearance of the tire.

Advertising value lies in distinctiveness. That pattern is most distinctive which differs most from all others, is simple and yet noticeable, impressing itself on the mind in association with its trade name.

The tread design can be seen only when the tire is stationary. This is worth keeping in mind. Seen from the side the tire does not usually show the pattern because of the contour of the tread and the overhanging fenders. This militates against a pattern that extends from one side of the tread to the other. The same objection holds for a letter placed transversely of the tread and seen from the end instead of the base and therefore not readily distinguishable.

Correct Design Exemplified

Analysis of the design shown in Fig. 2 shows it to conform with practically all the requirements of a satisfactory tread. The crosses alternating with the diamonds might be broader in both transverse and longitudinal directions to give them greater stability and increase the durability of the tread.

It will be noted that the design shows transverse, longitudinal and diagonal recesses, which counteract slipping tendencies in every direction. These recesses are continuous and have outlets at the sides of the tread for egress and ingress of air. The design incorporates a series of capital M's arranged on either side of the continuous central rib. They are inconspicuous when the tire is viewed endwise and are subordinate to the diamonds and crosses. When the tire is looked at from the side, however, the letters are the outstanding feature.

Cross sections through the tire show plenty of tread rubber in contact with the road at all stages of rotation, with the exception that at the ends of the M's there are gaps of one-quarter to three-eighths of an inch in width at the transverse depressions, where the central rib carries most of the load. This interval is too small to affect the durability, however, since even under high inflation pressure the area of tire in contact with the road is from four to six inches in length and two to three inches in width.

The design is characterized by simplicity. There is no attempt at ornamentation, but adherence to straight lines of the minimum number required to produce the letter M. Other straight line letters can be similarly treated and may be worked into geometric patterns corresponding with the diamond and cross, which will subordinate the letters.

If the recessed channels have walls tapered toward the bottom and are rounded at the base, they will free themselves more readily of clay and sticky mud as the tire rotates. Also, the rounded bases of the channels will avoid a sharp angle at the bases of the raised portions so that these will resist better any tendency to tear loose from the underlying rubber. Similarly, by rounding off the vertical sides of the raised tread into the convex contour of the side walls of the tire, resistance against side thrust when turning corners will be produced and avoidance of danger of stripping the tread.

It is thus seen not only that a well designed tread calls for consideration of the main objects to be accomplished, but that much thought must be bestowed on the production of a design combining the essentials in a way that will not over emphasize any one of them at the expense of the others.

NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS

A largely attended special meeting of the National Association of Waste Material Dealers was held at Hotel Astor, New York, N. Y., February 14, 1923, at which a cotton waste division was organized.

The meeting was followed in the evening by the tenth annual banquet, at which notable speakers discussed important topics and the occasion was enlivened by a high-class entertainment.

TENTH NATIONAL FOREIGN TRADE CONVENTION

On April 25, 26 and 27, 1923, the Tenth National Foreign Trade Convention of the National Foreign Trade Council will meet at New Orleans, Louisiana. This city is an important center for foreign trade and its shipping facilities have been greatly developed in recent years, corresponding with the increase of our trade with the West Indies and Central and South America. O. K. Davis is secretary of the National Foreign Trade Council, 1 Hanover Square, New York, N. Y.

RUBBER ROOFING STOCK

Pine asphalt of proper consistency and melting point is used in combination with reclaimed rubber in the manufacture of rubber roofing. From the same asphaltic base a mineral rubber is also prepared. Both products are known under the same trade mark as "Texaco" and are being introduced to rubber makers for compounding purposes.

Abrasion Testing Machine

THE abrasive resistance produced by compounding ingredients in tire treads, heel and sole stocks, and other rubber products in which resistance to wear is of prime importance, may be advantageously measured by means of the abrasive machine designed and developed by Harlan A. Depew[1].

The assembly of the machine, in perfected form, is illustrated in Fig. 1, which shows it mounted on a table resting on steel supports with an under shelf carrying the motor connected with the mechanism for rotating the abrasive track. Arranged above and around the track are four identical sets of accessory apparatus shown in clearer detail in Fig. 2.

These parts comprise in each set the following: Sample holder A supports a test piece of rubber for test. The test sample measures two by five inches by 0.2-inch thick. It is inserted through a slot, as seen in Fig. 2 where one of the sample holders is being raised by the operator, and is made secure by setting a steel jaw against a line drawn 3½ inches from the end of the test piece. The surface for abrasion is then two inches square. As arranged for making a test a standard reference sample is placed in one of the four holders and the other samples are held in the remaining holders.

The other attachments around the track are cylindrical bristle brushes B, revolving against the track as it moves to loosen the abraded rubber, which is carried away by an exhaust through dust pipes C, which lead to fan and bag for collection. Keeping the track clear of abraded material is of major importance.

Composition of Track

It is obvious that the nature of the track is important. It is important in making a track to employ sized crushed abrasive

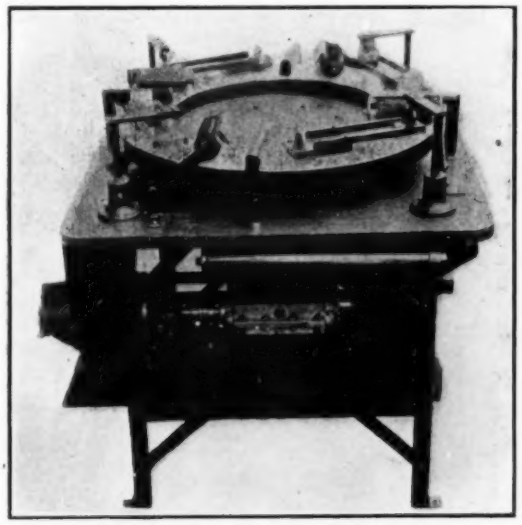


Fig. 1. Assembly of Abrasion Machine

with only enough cement to bond the particles. The composition decided upon is:

Abrasive, 10-14 mesh quartz	48 parts by volume
Portland cement	19 parts by volume
Lime	5 parts by volume

[1]Chemist in charge of the Rubber Laboratory, Research Department, New Jersey Zinc Co., Palmerton, Pennsylvania.

Only enough water is added to make a thick paste. The material is tamped into place and allowed to harden. The next day the surface is worn away with a rasp. After two or three days rubber specimens are placed in the holders and the track run

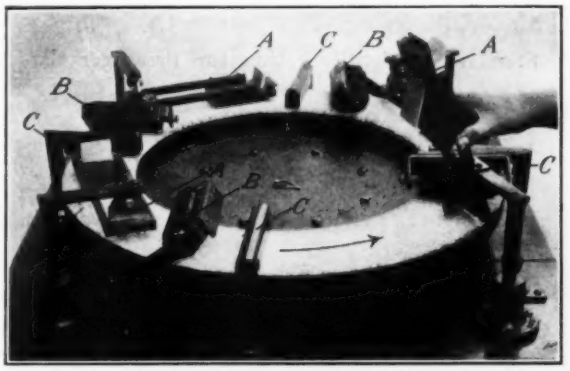


Fig. 2. Details of Track, Sample Holders and Track Cleaning Devices

for a week to wear down the surface. By this time the track is worn down appreciably and in a condition such that continued wear will not greatly change the track surface.

Speed of Track

The speed of the track is about 30 revolutions per minute. It must not move too rapidly, otherwise the frictional heat will be large.

Calculation of Results

The loss in weight divided by the number of revolutions gives the loss in weight per 1,000 revolutions. This figure divided by the density gives the volume loss per 1,000 revolutions.

If the volume loss of the standard is 5.45 and that of a sample 4.22, then since the standard is arbitrarily 115, the sample will have a resistance to wear of $\frac{5.45}{4.22} \times 115 = 148$.

Since the values are relative, the number of revolutions is not necessary for calculating the resistance to wear; but the volume loss per 1,000 revolutions for the standard should be practically the same in successive determinations; and the number of revolutions is recorded to obtain this figure.

PROPOSED BRAKE-LINING STANDARDS

The Technical Committee of the Brake-Liners Association has recommended that the following list of inch sizes of brake-lining be accepted as an S.A.E. Standard.

1¼ x 5/32	1½ x 3/16	2 x¼	3 x 5/16
1½ x 5/32	1¾ x 3/16	2½ x¼	3½ x 5/16
1¾ x 5/32	2 x 3/16	3 x¼	4 x 5/16
2 x 5/32	2½ x 3/16	4 x¼	

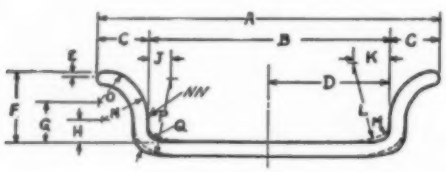
It is thought that the adoption of such a revision would place the brake-lining manufacturers in a better position to object to making odd sizes such as 1⅞ by 5/32 in. The suggestion has been referred to the brake-lining subdivision of the Parts and Fittings Division, which has been working on the standardization of brake-lining tests and specifications for some time in cooperation with the Bureau of Standards and manufacturers.—*S. A. E. Bulletin*, January, 1923.

Tire and Rim Association Standards

THE following dimensions and tolerances of straightside rims for passenger cars, cylincher rims, motorcycle rims and pneumatic truck tire rims, have been standardized by the Tire & Rim Association of America.

The more important rim standards only are given but, in addition to those shown, the association has adopted standards on felloe bands for pneumatic truck rims, straightside airplane rims, millimeter rims and dimensions of valve holes and driving plates. It has also adopted for inspection purposes special gages and tapes for measuring rims.

Standard Straightside Rims for Passenger Cars



	Dimensions (Inches)			Tolerances (Inches)
	3½"	4"	4½"	
A	3.432	3.888	4.38	
B	2.312	2.688	3.12	±.063
C	.56	.60	.63	
D	1.156	1.344	1.56	
E	.031	.031	.031	
F	.687	.780	.875	+.047—.016
G	.367	.44	.495	
H	.199	.245	.303	
I	.1875R	.1875R	.1875R	
J	.25	.25	.3125	
K	.406	.406	.406	
L	.937R	.937R	.937R	
M	.125R	.125R	.125R	
N	.56R	.56R	.615R	+.047—.016
O	.32R	.34R	.38R	
P	.84R	.84R	1.095R	
Q	.0937R	.0937R	.0937R	

In applying tolerance "N" the lower point of curvature "NN" is fixed.

Circumferential tolerance, ±.047" except on Q.D. rims on the gutter side only, tolerance +.047" and —.063".

The flange must extend not less than $\frac{1}{16}$" beyond the high point of curvature.

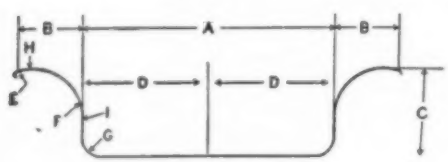
Projections in rim base must not exceed $\frac{1}{32}$" and depressions must not exceed $\frac{1}{16}$".

Rims must align within 1/64".

Split rims must close to within $\frac{1}{16}$".

Any groove or depression rolled or otherwise formed in the rim base must not extend more than ½" from the rim flange, nor be more than $\frac{1}{16}$" deep.

Standard Rims for Pneumatic Truck Tires

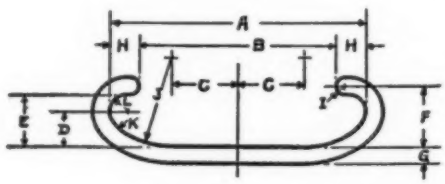


	5"		6"		7"		8"		10"		12"	
	Dimension	Tol.	Dimension	Tol.	Dimension	Tol.	Dimension	Tol.	Dimension	Tol.	Dimension	Tol.
A	3.75	±.047	4.33	±.047	5.00	±.047	6.00	±.063	7.33	±.063	9.00	±.078
B	.78	.....	1.00	.....	1.00	.....	1.25	.....	1.50	.....	1.75	.....
C	1.0625	±.024	1.2656	±.024	1.2656	±.024	1.50	±.031	2.00	±.031	2.50	±.031
D	1.875	.....	2.165	.....	2.50	.....	3.00	.....	3.665	.....	4.50	.....
E	.09375R	.....	.140R	.....	.140R	.....	.1875R	.....	.1875R	.....	.25R	.....
F	.625R	.....	.7187R	.....	.7187R	.....	1.25R	.....	1.25R	.....	1.50R	.....
G	.25R	.....	.25R	.....	.25R	.....	1.3125R	.....	.3125R	.....	.375R	.....

Circumferential tolerance on all sizes ±.046.

Gage must fit contour from "I" to "H," where "H" represents a point $\frac{1}{16}$" beyond the point of extreme height of flange.

Standard Clincher Rims

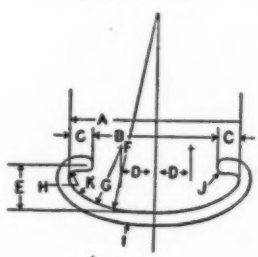


	Dimensions (Inches)		Tolerances (Inches)
	3"	3½"	
A	2.27	2.6	
B	1.76	2.05	±.047
C	.53	.68	
D	.34	.34	
E	.45	.50	+.016—.008
F	.5125	.578	
G	.125	.156	
H	.255	.275	+.047—.008
I	.0625R	.078R	
J	.80R	.91R	
K	.29R	.35R	
L	.11R	.14R	

Circumferential tolerance ±.047.

Point "I" edge of clinch must be substantially half round and free from sharp edges.

Standard Motorcycle Rims



	Dimensions Inches		Tolerance Inches
	"B-B"	"C-C"	
A	2.01	2.16	
B	1.50	1.65	±.046
C	.255	.255	±.008
D	.40	.475	
E	.5595	.575	+.008—.000
F	2.525R	2.636R	
G	.80R	.80R	
H	.11"R	.11"R	
I	.083"	.083"	
J	.0625R	.0625R	
K	.29R	.29R	

Circumferential tolerance ±.046".

Rims must surface within .035".

What the Rubber Chemists Are Doing

Colloid Chemistry and the Rubber Industry

THE following quotations from the American lectures of Dr. Wolfgang Ostwald[1] summarize the principles underlying the science of colloid chemistry and their application to the manufacture of rubber as a typical colloid industry.

Colloids Defined

Colloids are dispersed systems in which the diameter of the dispersed particles in typical cases lies between one ten-thousandth and one millionth of a millimeter[2]. They are distinguished experimentally from molecularly dispersed systems by the fact that they do not dialyze; and from coarse dispersions by the fact that they cannot be analyzed microscopically. Colloids pass through filters readily, while coarse dispersions do not. Transition systems exist between colloids and molecular solutions and between colloids and coarse dispersions. The colloid state represents a universally possible state of matter. There is no reason why every substance may not be produced in colloid form. It may be accomplished either through the dispersion of non-dispersed or coarsely dispersed substances, or through the condensation of molecularly dispersed systems. To these ends not only chemical but mechanical, electrical and other kinds of energy may be used.

The primary characteristic of a colloid is its special degree of dispersion. If this is true then colloid chemistry becomes, primarily, not the science of the properties of a special group of substances but that of the properties of a physico-chemical state into which any substance may be brought.

Rubber Manufacture Typically Colloidal

The manufacture of rubber represents a typical colloid industry. A number of colloid and dispersoid chemical processes are observable even in the first preparation of crude rubber. Soft rubber comes from latex, which consists of a dispersion of tiny droplets of tenacious liquid in an albuminous serum.

Just as in ordinary milk, it is probable that the protein surrounds the soft rubber globules as an adsorption membrane. This protein seems to play a great rôle not only in the original coagulation of the latex, but also in giving to soft rubber its characteristic mechanical properties. The protein is apparently of the group of the globulins. All the various coagulation methods employed seem to be nothing but protein precipitation methods. Their proper employment seems to be a fundamentally important feature in the whole process of soft rubber preparation.

Freshly prepared raw rubber shows a marked syneresis. It squeezes off a protein-rich serum. A proper separation of this material is of great importance, since it reduces the possibilities for bacterial growth.

Raw rubber swells tremendously in different organic solvents. Upon the application of heat, and through mechanical agitation, a large part of the soft rubber may be made into "solution." In this process the remnants of coagulated protein left in the soft rubber undoubtedly play an important part since they serve to counteract the tendency of the swollen rubber particles to go into sôlution. These solutions of soft rubber behave like typical solvated emulsoids. They show great absolute viscosities, great relative increases with rise in the concentration of the colloid, phenomena of aging, etc. All the observed phenomena are complicated through the presence of traces of the protein. The presence of such may apparently explain the fact that upon the addition of acids there occurs a rapid decrease in the viscosity of soft rubber sols. This viscosity of the soft rubber is of great importance in determining the life of the solid rubber.

It has been found that, as a rule, a relatively high viscosity yields a lively rubber. In fact, under certain circumstances this parallelism is a quantitative one in that the viscosity value parallels directly certain mechanical properties of the vulcanized product, like its resistance to tear.

Vulcanization

Of great importance is the process of vulcanization—that series of important physico-chemical changes which occurs when soft rubber is heated with sulphur or sulphur compounds. At least three different types of changes are to be distinguished from each other in the process of vulcanization: First, the taking up of the sulphur or sulphur compounds; second, their fixation; third, the changes in state in the rubber following therefrom.

The nature of the first of these processes is still a matter of lively debate. Some maintain it to be a typical adsorption phenomenon, while this view is cast aside entirely by others. How greatly opinions differ is well illustrated in two papers which appeared almost simultaneously. In one of them the author took it almost for granted that a colloid like rubber should show adsorption phenomena; in the other the author concluded that not a single fact argued for the importance of adsorption in the process of vulcanization.

The Adsorption Phenomenon

Since the writer of this paper was the first to defend the adsorption notion—though not by any means holding it to be an entirely self-evident one—he naturally inclines to the view that the taking up of the sulphur is really an adsorption process. This view is supported not only by the fact that the process is governed by the adsorption law, but by the results of D. Spence's extraction experiments which show that the amount of sulphur adsorbed is inversely proportional to the reciprocal function of the free sulphur. In spite of these corroborative finds by Spence the author still maintains in his recent papers that adsorption processes play no important rôle in the process of vulcanization. A criticism of Spence's most recently expressed views is left for the future.

C. Harries[3] has come to the conclusion that the taking up of sulphur by rubber is largely an adsorption phenomenon. After the sulphur has been taken up by adsorption an important chemical union may take place. But there also occurs at this time an important change in the state of the rubber.

What is the nature of the colloid-chemical changes which mark the change from raw rubber to vulcanized? Can they be regarded collectively from some such general point of view as can tanning? Whatever is said must be applicable, of course, to natural and to artificial rubber, for both can be vulcanized even though the resultant products are not equally good.

Synthetic and Natural Rubbers Are Isocolloids

To the colloid chemist, synthetic and natural rubbers are isocolloids, in other words, gels in which the structural elements consist of polymerized molecules in association with simpler molecules of the same chemical composition, polymeric particles, for example, dispersed in a phase of nomeric ones. Natural rubber is possessed of a second type of heterogeneity because of the dispersion within it of protein, resin, etc., in finely divided form. The surface capable of adsorbing sulphur is represented by the surfaces of the original latex droplets. Just as in the case of the fibrils in hide, these droplets are originally gummed together and must first be "loosened up," either through heat, in the process of vulcanization, or through some substance which brings

[1] "An Introduction to Theoretical and Applied Colloid Chemistry." Second American Edition, New York, John Wiley & Sons, Inc.

[2] One millimeter = 0.03937-inch.

[3] Kolloid-Zeitschrift, 19, 1, 1916.

about their swelling, as in the process of cold vulcanization. In either case the actual vulcanization, that is to say, the process of taking up sulphur, seems to displace the equilibrium existent between the elements in the rubber, with their different degrees of polymerization, in the direction of an increase in the more highly polymerized fractions. Were a mass of rubber thought of as a series of fused latex droplets but with the outside of the mass more highly polymerized than the more liquid inside, vulcanization would represent a progressive solidification of the sphere. Whether polymerization is thought of chemically or colloid-chemically, as for example a coalescence of particles similar to the "condensation" observed when a rubber sol is precipitated with sulphur monochloride, is a question of secondary importance.

The process of vulcanization, as the process of tanning, can also be carried too far, and the rubber be made brittle. Vulcanization is therefore not unlike tanning, only in the case of rubber it is an isocolloid which is coagulated. Instead of being dehydrated the particles of rubber suffer a colloid-chemical condensation; in other words, the number of coarsely dispersed particles, with their high viscosities, is increased. But, just as in tanning, a definite structure possessed by the gel as a whole must not be destroyed. Loss of such, as induced through too violent milling, may take all the "life" out of rubber.

Unusual Vulcanization Methods

Vulcanization by exposure to radiant energy like ultra-violet light shows many analogies to the physical phenomena seen, for example, in the coagulation of proteins and to the chemical ones observed in the photo-polymerization of styrol to metastyrol. Mention needs also to be made of vulcanization "without sulphur," as when litharge or trinitrobenzene are used by the Ostromislensky method.

Raw rubber can in these ways be changed to a vulcanized product, though its technical value is still low. It would indeed be strange colloid-chemically if sulphur alone could coagulate (*cure*) rubber in the manner sketched above. It is more probable that the future will bring us as various a series of methods of vulcanization as we have today of tanning.

Benzol Poisoning[1]

Comparative Toxicity of Benzol, and Benzol-Rubber Solutions. Experimental Researches on the Toxicity of Naphtha, Gasoline, and Toluene.—These two papers contain the results of the experimental researches on the poisonous effects of the coal tar and petroleum solvents mentioned as used industrially in rubber working. These studies were undertaken at the suggestion of Pirelli & Co., Milan, Italy, conducted under standardized experimental conditions on a variety of small animals, including dogs, rabbits, pigeons, etc. The author summarizes his investigation on benzol as follows:

1. Chemically pure benzol is more poisonous than the mixed commercial grades commonly used in the rubber industry.

2. Benzol solutions of rubber in the quantities handled by the individual worker never cause acute poisoning, although the body temperature is lowered and the number of white corpuscles is diminished. These effects are more marked in the case of rubber cement made with pure benzol.

3. Animals subjected repeatedly to breathing benzol vapor in closed chambers become super-sensitive to its poisonous action.

4. Benzol poisoning is more easily avoided by means of proper ventilation and is more controllable than poisoning by other industrial substances, such as lead or phosphorus.

The materials investigated in the second series of experiments were two samples of Roumanian naphtha and pure and commercial toluene. Of these toluene shows the least poisonous effects but causes irritation of the membranes of the eyes, nose, and throat, inducing weeping, sneezing, and coughing. Naphtha or gasoline (benzine) as a substitute for benzol as a solvent causes cumulative poisoning. Prevention of this effect requires the same precautions of continuous and thorough ventilation as in the case of benzol; therefore it would seem to be as well to continue the use of benzol with proper ventilation, since it is technically superior.

[1] Prof. Angelo Pugliese. Proceedings, Reale Instituto Lombardo di Science e Lettre, Vol. IV, 1922, 11-15.

Effect of Litharge on Accelerators

The following quoted from a recent paper by P. L. Bean[1] deals with the influence of litharge on accelerators.

It has been widely believed that accelerators cannot be used in rubber mixes containing litharge, owing to the so-called poisoning effect of the latter. This point has been emphasized by Dr. Lothar Weber[2].

In the present investigation the accelerator piperidyl-dithiocarbamate of piperidine was employed in the form of a preparation known commercially as L suparac, which consists of the active compound deposited on a mineral base. A series of mixings were made as follows:

A. Base Mixing	Rubber	100.0
	Sulphur	3.0
	Zinc Oxide	10.0
	Accelerator	2.5
B. Base Mixing plus Litharge		0.5
C. Base Mixing plus Litharge		2.5
D. Base Mixing plus Litharge		5.0
E. Base Mixing plus Litharge		7.5
F. Base Mixing plus Litharge		10.0

After a period of two weeks had elapsed, vulcanization was effected in ring molds in the press at 141 degrees C, 40 pounds steam, the plates being heated up before introduction of the molds and no rise given. After resting for two days, ring test pieces were cut and tested on the Schopper machine. The figures obtained for tensile strengths, type, etc., are given below.

Mix	Cure Minutes	E *a*	E, *b*	Type *c*	Break *d*	Elongation at Break
A	3	584	660	30	2,792	8.69
	5	570	640	28	2,579	8.40
	7½	526	596	28	3,094	8.23
	10	518	594	30	2,779	7.91
B	5	603	683	32	1,529	8.74
	7½	515	590	30	2,545	7.72
	10	508	580	29	2,712	7.73
C	5	712	814	41	1,781	9.51
	7½	567	647	32	1,741	8.01
	10	523	596	29	2,536	7.80
D	5	720	820	40	1,960	9.81
	7½	596	677	32	2,472	8.69
	10	543	622	32	2,937	8.36
E	3	764	867	41	1,876	10.16
	5	676	770	38	2,034	9.35
	7½	569	650	32	2,934	8.77
	10	540	613	29	2,742	8.18
F	3	723	825	41	1,972	9.95
	5	651	746	38	2,080	9.16
	7½	567	645	31	3,060	8.77
	10	546	622	30	2,658	8.20

Explanation. *a* = elongation per cent at load corresponding to 600 g. per square mm. of cross section, *b* = elongation per cent at load corresponding to 1,040 g. per square mm. of cross section, *c* = type slope = E, — E/2.5, *d* = breaking strain in pounds per square inch, *e* = elongation at break taking the original length as unity.

The effect of litharge on this accelerator is apparently a retardation of vulcanization at the outset, the subsequent action of the accelerator being the same as if litharge were absent. This leads to the conjecture that the action of the litharge is to raise the critical temperature of the accelerator.

A second series of experiments gave results showing that the addition of a small quantity of litharge to mixes containing piperidyl-dithiocarbamate of piperidine entirely prevents premature curing without the disadvantage of appreciably lengthening the time of cure.

[1] India Rubber Journal, December 23, 1922.
[2] THE INDIA RUBBER WORLD, July 1922, 681.

The Vulcanization of Rubber in Solution[1]

The reaction between rubber and sulphur in various solvents varies with the concentration of the rubber in solution. The solvents used in the investigation were of two groups: (1) nitrobenzene, naphtha and phenetol; and (2) aniline, xylene and thymol.

[1]Boiry, Comptes Rendus, 175, 102-104.

Chemical Patents

The United States

ROSIN MATERIAL FOR SIZING. A method of producing a rosin having superior properties, which consists in incorporating a rubber product and rosin into a solvent and finally removing the solvent by distillation.—Judson A. De Cew, assignor to Process Engineers, Inc., both of New York, N. Y. United States patent No. 1,433,124.

VULCANIZABLE HYDROCARBON PRODUCTS AND PROCESS. Olefine hydrocarbons are treated with ozone at a temperature below that at which the hydrocarbons distil, until a solid or semi-solid elastic product capable of vulcanization is obtained.—Harry H. Culmer, Independence, Kansas. United States patent No. 1,430,538.

VULCANIZABLE COMPOSITIONS AND PROCESS. A composition consisting, in parts by weight of not more than 25 of rubber, 60 of siliceous earth, five of sized mica, two of hydrated lime and eight of sulphur.—William E. Gardner, Pittsburgh, Pennsylvania. United States patent No. 1,440,455.

WATERPROOFING COMPOSITION AND PROCESS. A waterproofing composition comprising one part cumar, two parts rubber, two parts paraffin, and 20 parts hydrocarbon oil.—Clarence D. Shaffer, assignor to Textile Leather & Metal Preserver Co., both of Kalamazoo, Michigan. United States patent No. 1,441,605.

METHOD OF PRODUCING FINE POWDERS. Fine powders are precipitated from gases by bringing together the reacting gases under reacting conditions in the presence of a relatively large diluting volume of inert gas whereby the precipitated solid compound is secured in finely divided form.—Warren K. Lewis, Newton, Massachusetts, assignor to The Goodyear Tire & Rubber Co., Akron, Ohio. United States patent No. 1,442,485.

RUBBER COMPOSITION AND PROCESS. A novel composition of matter, vulcanized substantially uncoagulated alkaline rubber latex.—Phillip Schidrowitz, London, England. United States patent No. 1,443,149.

ACCELERATING THE VULCANIZATION OF RUBBER AND PROCESS. A process of producing new agents for accelerating the vulcanization of rubber or rubber-like substances, consisting in heating together paranitroso dimethylaniline and sulphur to a temperature of approximately 130 to 135 degrees C., recovering the reaction residue and condensing the vapors formed to constitute accelerating agents.—Stanley J. Peachey, Davenport, Stockport, England. United States patent No. 1,443,381.

The United Kingdom

PLASTIC COMPOSITIONS. Gels or self-vulcanizing solutions of india rubber, balata, or gutta percha, or mixtures of these substances, are incorporated with finely divided materials, such as leather, wood flour, cork dust, waste rubber, and fibrous materials. The compositions are preferably molded under pressure.—A. Herring-Shaw, 83 Pall Mall and S. J. Peachey, 44 Platts Lane, Hampstead, both in London. British patent No. 189,242.

VULCANIZING INDIA RUBBER. Rubber solutions are vulcanized by the action of hydrogen sulphide and sulphur dioxide in the presence of quinone. Vulcanization to a non-flowing gel takes place in 12 minutes.—Peachey Process Co., Ltd., 83 Pall Mall and S. J. Peachey, 44 Platts Lane, Hampstead, both in London. British patent No. 190,051.

COAGULATION OF RUBBER LATEX. This invention relates to an improved process for coagulating latex in the preparation of rubber, and consists in mixing the latex with hydrofluosilicic acid or a suitable salt thereof, particularly sodium silico-fluoride.—John Edwardes, Chemist to the Rubber Growers' Association, Petaling, Selangor F. M. S. British patent No. 9,665, April 4, 1922. Not yet accepted.

The Dominion of Canada

PLASTIC COMPOSITION. A plastic composition consisting of equal parts of coarse rubber and a composition of long fiber cotton and high grade rubber friction and skim, an alkaline earth in amount substantially less than either the rubber or the rubber and cotton content, a compound of antimony and sulphur in amount substantially equal to the alkaline earth content and containing a minor proportion of sulphur, an oxide of a metal and a vulcanizing constituent in substantially equal amounts.—Bela W. Rote, Cleveland, Ohio. Canadian patent No. 227,034.

VULCANIZATION ACCELERATOR AND PROCESS. The process of treating rubber or similar materials, which comprises combining with the rubber compound a vulcanizing agent and diphenylguanadine.—The Dovan Chemical Corporation, Newark, New Jersey, assignee of Morris L. Weiss, New York, N. Y. Canadian patent No. 227,316.

Germany

Patents Issued, with Dates of Issue

354,344 (January 1, 1920) Conversion of rubber into material resembling gutta percha. Dispersions of hydrohalides or halogen derivatives of rubber in chloroform or ethylene chloride are reduced by treatment with zinc or other metals, and the product is washed with water or dilute acid. The product is more or less viscous according to the method of treatment, and resembles gutta percha if ethylene chloride is used as dispersion agent. Siemens und Halske.

357,665 (August 5, 1919) Insulating material for electrical conductors and cables. Partially polymerized synthetic rubbers, or natural rubbers, gutta percha, balata or mixtures of these, depolymerized in each case so as to afford a thick, viscid mass, are employed. Felton und Guilleaume Carleswerk.

ANALYSIS OF MIXTURES OF ASBESTOS AND COTTON[1]

A satisfactorily close determination of the relative amounts of asbestos and cotton in admixture is not possible either by loss of weight on ignition or by determination of silica in the asbestos because of variations inherent in the different varieties of asbestos employed.

A satisfactory method of analysis, however, has been developed, based on the solubility of cellulose in a solution of cupriammonium sulphate. This solution does not act appreciably in the cold on asbestos.

Following is the method of analysis: From 0.2 to 0.5-gram of the material is dried at 110 degrees C. to constant weight to determine its hydroscopic moisture, which is generally from 0.5 to 2.4 per cent. The determination of fatty matters is accomplished by extracting the dried sample with ether. The water soluble contents, salts, starch, etc., are extracted by boiling for two hours. The residue is then soaked for 12 hours, with frequent stirring, in 30 cm. of cold cupriammonium freshly prepared and containing about 19 grams of copper to the litre. This dissolves the cellulose completely in about two hours. Filter the solution in a Gooch crucible, thoroughly wash the residue of asbestos with dilute cupriammonium, and dry at 110 degrees C. to constant weight.

This gives the pure asbestos. The filtrate is acidified with dilute sulphuric acid, after addition of salt to precipitate the cellulose in a form adapted for filtration in a Gooch crucible. After filtration the residue of cellulose is dried at 110 degrees C. and weighed. The method is exact to 1.5 per cent.

[1] P. Heermann and H. Sommer in Mittheilungen aus dem Materialporüfungsamt, 39, 315, 1921.

The Tensile Testing of Rubber

A Plea for Further Investigation Aiming at Standardization

By G. Stafford Whitby

THE greatest drawback hitherto attaching to the use of dumb-bell-shaped test pieces has been in connection with the measurement of extension. The articles by C. J. Burkley and Harlan A. Depew show that this drawback can be overcome more or less satisfactorily[1]. And, both on this account and on account of the revival of interest in the question of the standardization of physical testing, which was displayed at the last two meetings of the Rubber Division of the American Chemical Society, the time seems opportune to consider the question of the most suitable type of test piece, the most suitable dimensions for test pieces, and the most suitable type of tensile testing machine. It would seem that the time is ripe for reviving the old International Rubber Testing Committee, with the object of encouraging and coordinating investigations into the not inconsiderable number of points still open regarding the tensile testing of rubber, and ultimately of bringing about standardization.

Methods of Obtaining One-Man Records

In order to get the data necessary for the construction of stress-strain curves, it has hitherto usually been necessary in the case of straight test pieces to employ two observers, so that simultaneous readings of load and elongation might be made at intermediate points throughout the stretching. By means, however, of the arrangement described by Burkley, it is possible for a single observer to get such readings. And Depew points out that by use of the Olsen Navy testing machine it is possible with straight test pieces to get a continuous and autographic record of stresses and strains. Naturally the question arises as to which of these two methods of recording stress-strain data is the more acceptable; as to whether the continuous, direct, but wavy, autographic record supplied by the Olsen machine or the data for the loads corresponding to each 100 per cent elongation as obtainable on the Scott machine is the more convenient. I cannot see that there is a great deal to choose between the two forms of record but would like to hear the opinions on the point of men who are daily engaged in routine physical testing. In the meantime I note the following points:

(1) In order that stress-strain curves shall be of much real help in the comparison of different vulcanizates they must be assembled on a single sheet, so that one can see at a glance the way in which and the extent to which the curve is altering with progressive curing. Presumably, it is possible with the Olsen machine to draw the curves for a series of vulcanizates satisfactorily on a single sheet, and if such is the case the machine must be considered as sufficiently satisfactory for most ordinary testing, as, presumably, the waviness of the curves would not be a serious drawback in such testing. With the Scott record the curves can easily be assembled on a single sheet, but of course are not, as with the Olsen record, obtained from the machine already drawn. For research work smooth curves are certainly desirable; but such could easily be drawn on the Olsen record.

(2) A numerical expression for the way in which the curve shifts during progressive curing is often wanted, and is given by stating the load necessary to produce a given elongation. Now with the Scott record one has such a quantity directly in the record, and as such a figure is often all that is required (in addition of course to breaking figures), the remainder of the stress-strain data could often be left reposing on the record card, to be called upon only if required. With the Olsen record, such a quantity would have to be read off from the curve, after first drawing a smooth curve.

(3) The energy of resilience can be calculated from the Scott data without drawing the curves.[2]

Comparison of Ring and Straight Test Pieces

It must be confessed that even with the improved methods of obtaining stress-strain data which are described by Burkley and Depew, the straight test piece is inferior in convenience to the ring. The superiority of the ring over the straight test piece in regard to convenience will hardly be disputed by those who have had experience with both forms; the case for the adoption of the straight test piece in preference to the ring is the superior accuracy of the results obtained with the latter. The question as between these two forms of test piece has not yet, I feel, been threshed out as thoroughly as could be wished; and until the question has been more fully examined it will be impossible either to design the ideal tensile testing machine or to bring about uniformity in the tensile testing of experimenters in different parts of the world. Of the considerable number of points with regard both to ring and to straight test pieces which have not yet been adequately examined, the following may be noted:

Fig. 1. Fig. 2. Fig. 3.

Stress-Strain Curves

Ratio of Tensiles for Straight and Ring Specimens

In circular No. 38 of the Bureau of Standards it is argued with much cogency that owing, in the case of rings, to an uneven distribution of stress across the cross section, ring test pieces must show figures for tensile strength which not only are too low but which bear no constant ratio to the (correct) figures obtained with straight test pieces. Yet if the actual data for six rubber compounds given in the above circular[3] are scrutinized and the results for rings are compared with those for straight test pieces cut across the calender direction (the circular points out that only such straight pieces are truly comparable with rings), it will be seen (a) that in the case of the higher grade compounds (with tensiles 2575, 2030, 1260, and 1700 pounds per square inch respectively) the ratio of the breaking stress for rings to that for straight pieces is almost constant, being in the different compounds 0.83, 0.83, 0.84, and 0.89; (b) that in the case of the low grade compounds (tensiles 510 and 690 pounds per square inch respectively) the breaking stress for rings is either equal to or greater than that for straight pieces, the ratios being 1.00 and 1.06.

[1] THE INDIA RUBBER WORLD, October 1, 1922, 24, 25. THE INDIA RUBBER WORLD, December 1, 1922, 154.

[2] Sheppard, THE INDIA RUBBER WORLD, October 1, 1921, 29. Compare Perry, "The Steam Engine," 1909, p. 246.

[3] Circular No. 38 of the Bureau of Standards, 4th Edition, 70.

Those who employ rings for testing presumably make the assumption that for compounds of more or less similar character the stresses measured by means of rings bear a constant ratio to the true stresses. As indicated above, the actual experimental data given in the Bureau of Standards' circular hardly suffice to negative such an assumption. If such an assumption proves to be sufficiently correct, it may be found most satisfactory to use rings and an autographic recorder for much ordinary testing, where comparative results for only a limited class of compounds are required, and to use straight pieces only for special work where absolute results are required. The modifications necessary in existing testing machines so that they could be easily converted to use with either form of test piece would not be serious.

In view of the importance of the question of the ratio of the results given by the two forms of test piece, it is certainly desirable that a more extensive series of vulcanizates should be studied in this connection. It is, for example, advisable to ascertain whether, when it is desired to study the influence of a given compounding ingredient by introducing various volumes of it into a compound, the ratio of the stresses observed with rings will remain sufficiently constant to allow of the employment of ring test pieces without serious error. Further, no comparative tests have hitherto been made with pure gum stocks.

Influence of Dimensions of Test Piece

Standardization is needed with respect to the dimensions of test pieces, and as an aid to such standardization further investigations into the influence of the dimensions of the test piece on the tensile results are desirable, especially in the case of straight pieces. Memmler and Schob[4] published the results of a large number of tests with rings of different dimensions. The very large influence which the dimensions of the test piece may have on the tensile results is shown by, for example, the case of a compound which when tested by means of a ring half the usual width (i.e., a ring 2 by 5 instead of 4 by 5 mm. cross section), showed an increase in tensile strength of 35 per cent, from 1,675 to 2,260 pounds per square inch, and when tested by means of a ring 1 by 2.3 mm. in cross section and 44.5 mm. in diameter gave a tensile strength (2,400 pounds per square inch) 45 per cent greater than that which it gave when tested by means of a ring 4.05 by 6.7 mm. in cross section and 36.6 mm. in diameter. Fewer results concerning the influence of the dimensions of the test piece in the case of straight pieces have been published, but those recorded[5] also show that reduction of the cross sectional area increases the tensile strength.

It is probable that not merely the cross sectional area is of importance but also the ratio of the width to the thickness,—that, in fact, the superficial area of the test piece per unit length is of importance; for it would seem that the influence of the dimensions of the test piece on the breaking stress must be referred to a force of the nature of surface tension. Probably this force is associated primarily with the rubber itself as distinguished from the non-rubber constituents of a compound, although it is possibly affected in various degrees by the non-rubber constituents. It is apparently largest in stocks carrying a high proportion of gum. Hence it is probable that two test pieces cannot be regarded as strictly comparable, even though their cross sectional areas are the same, if their cross sectional dimensions are not identical.

The few stress-strain curves published in which a comparison is made between ring and straight test pieces show the curves obtained with rings as being somewhat softer than those obtained with straight pieces. This state of affairs may have been merely a result of differences in the dimensions of the test pieces. The point requires further examination.

In the case of straight test pieces the influence of the dimensions requires to be examined more closely, not only in the way just discussed but also in regard to the question of the manner in which the lines of stress run along dumb-bell shaped test pieces. A. H. Nuckolls[6] states that with a ½ inch-wide section "very little cross stress results on account of the enlargement of the ends." But for high grade stocks, especially when they have been cured with accelerators, ¼ inch or even ⅛ inch-wide strips are often used. Possibly an examination of the condition of such strips under strain by methods similar to those used by Coker in his studies of photo-elasticity would be of value. Such an examination would demand pale, transparent rubber, such as might be prepared by the Peachey process.

Grips

The condition of affairs over the pulleys, i.e. in the rubber in contact with the supports when rings are used, has not perhaps been given sufficient consideration. Memmler and Schob[4] showed that when the pulleys are stationary the test piece breaks under a much lower stress than when they are made to rotate, but a closer investigation in this connection seems desirable in order to ascertain the possible influence of the size of the pulleys, the material of which they are constructed, and the rate at which, by suitable gearing, they are made to rotate.

The grips now used for straight test pieces are by no means ideal, as failure in them often occurs when stocks of the highest grade are being tested. Elsewhere[7] I have described sliding wedge grips capable of holding the highest grades of rubber to the breaking point. Whether such grips can be conveniently employed on regular testing machines has not been ascertained; but in any event it is certain that the present form of grips leave some room for improvement.

The Ideal Testing Machine

Points such as those mentioned in what has preceded are all germane to the question of the design of the ideal testing machine. Some of the desiderata in a testing machine may be noted here: (1) It should give a smooth, automatic, graphical record of the stress-strain relations. (2) It should enable hysteresis tests to be made as well as extensions to the point of rupture, and should supply an autographic record of such tests. (3) It should be provided with a means of adjusting the stress applied to the cross section of the test piece, so that, despite variations in test pieces, the load applied per unit cross sectional area would always be the same. The only machine in which such provision is made is, I believe, the small hysteresis machine of Evans[8], but there should be no difficulty in heavier testing machines being fitted with adjustable weights on the load pendulum.

Uniformity in Presentation of Results

The establishment of a greater degree of uniformity in the manner of presenting the results of tensile tests is undoubtedly desirable.

Numerical data. I think that those of us who are now in the habit of expressing our numerical results in English units should, as a concession to good scientific practice and in the interests of uniformity, take the trouble to express them in metric units. Until we have become more accustomed to thinking of breaking stresses in metric units, we could perhaps accompany the metric figures with the corresponding English figures, in brackets.

Stress-strain curves. In the interest of uniformity I am inclined to support the proposal of Wiegand[8] that experimenters should agree to present stress-strain curves with strains as abscissæ and stresses as ordinates. Wiegand argues that to plot the curves in this way is correct, because when two variables are to be plotted against one another it is customary to plot the one read at definite

[4] Mitteilungen Königlichen Materialprüfungsamt, 1911, 29, 201, 204.
[5] Bureau of Standards' Circular No. 38, 4th Edition, 62.
[6] THE INDIA RUBBER WORLD, November 1, 1922, 79.
[7] Plantation Rubber and the Testing of Rubber, 1920, pp. 261-2.
[8] Described by North, Chemical Metallurgical Engineering, February 8, 1922, 254.

intervals along the x axis. This argument applied particularly to the case where stress-strain curves are to be plotted from records made, with straight test pieces, by reading loads at given intervals of elongation; it does not necessarily apply to other cases, where autographic records are made. In the case of the Schopper machine, for example, the arrangement of the autographic apparatus is such that stresses may justly be regarded as the quantities taken at fixed intervals. But, as a large proportion of stress-strain curves will continue to be made from the former kind of records, and as in other cases it need work little or no hardship to conform to the mode of presentation under discussion, I am inclined to favor the adoption of the latter.

In the Schopper machine the drum on which the curve is drawn is geared to rotate to the left in accord with the movement of the load pendulum, the pen being caused to move upward in accord with the extension. Hence, a curve as indicated in Fig. 2 is obtained. But it is merely necessary to turn the paper through 90 degrees in order to secure a curve, Fig. 1, running to the right hand with strains as abscissæ. In the case of the autograph given by the Scott machine when ring test pieces are used, the curve is drawn on a flat sheet which is moved downward in accord with the extension, the pen being moved to the right in accord with the movement of the load pendulum. Hence, a curve as in Fig. 3 is obtained. In order to make the curve run as in Fig. 1 it would be necessary to turn the paper over, but if the autographic attachment were arranged so as to draw a curve on the side of the paper away from the operator, a curve similar to that given by the Schopper machine would be obtained.

A not unimportant advantage of the proposed method of drawing stress-strain curves is that it conforms to the method of drawing hysteresis loops, which is generally recognized to be the most convenient.

[*] Canadian Chemistry Metallurgy, November, 1922. THE INDIA RUBBER WORLD, January 1, 1923, 224-225.

Internal Mixers[1]

Classification of Rubber Stocks—High Grade and Tire Stocks

THE following abstracts with the author's conclusions will be of interest to rubber compounders generally and especially to those not familiar with the advantages of rubber mixers of the internal type.

The internal mixer naturally appeals to the practical rubber man who has been accustomed to working his rubber on a mill by means of his hands and a knife and to putting his compound onto the rolls with a shovel, during which process he must inhale considerable dust and fumes. The idea of eliminating much of this labor and greatly reducing cost and fumes is attractive. Probably the advent of carbon black into the field of rubber compounding has done more than any other one thing to popularize the idea of internal mixing. Certain factors combined to make it more practicable to use the early design of internal mixer for mechanical goods stocks—that is, molded goods other than tires—rather than for tire stocks. Later improved designs and, as previously stated, the dirt nuisance from carbon black caused tire men to investigate its possibilities more carefully.

Classification of Rubber Stocks

Before discussing the behavior of various types of stocks it may be well to make a general classification for reference purposes. The rubber manufacturer roughly classifies his stocks as high grade and low grade, not upon the basis of the degree of satisfaction with which they perform the required functions in the finished article, but chiefly according to rubber content. Under high-grade stocks, therefore, we may class most tire compound, balloon stocks, and a few mechanical goods and so-called master batches which are simply mixtures of individual compounding ingredients with rubber, designed to facilitate handling or increase the accuracy of weighing. Low-grade stocks include most mechanical goods compounds, a few tire stocks such as bead fillers, and in this group we may also class accessories.

Mixing High Grade Stocks

In view of past experience best results were expected from high grade stocks, and a batch of 35 volumes of carbon black and 100 of rubber was used. Initial temperatures averaged around 50 degrees, and final temperatures about 95 degrees C. It was impossible to get a smooth mix, and the batch was dusty when dumped, showing incomplete mixing. Longer working of the rubber before the black was added improved this condition somewhat, but lumping continued to result, apparently from moisture taken from the rubber and condensed on the walls of the mixing chamber. The best results were obtained as follows: Broken down rubber was used and worked in the mixer for 5 minutes, then the compound was fed in very gradually until it was all assimilated. Total mixing time 25 minutes. A 60-inch mill was required to batch off, the final temperature of the batch being 142 degrees C. Stock appeared to be well mixed, with no lumps. There was noticeable lack of the glossy appearance characteristic of this batch when mill-mixed.

Facts established by experiment were that the chamber of the machine must be nearly full to mix properly, the rubber must be dry and fairly plastic before addition of the compound, which must be introduced slowly at a fairly uniform rate so that the mixing mass does not break up into lumps.

Tire Stocks

It was found that for high-grade stocks increase in speed is accompanied by increase in heat generated, power consumption, and slipping between the rotor and stock. The range of 21 to 23 r. p. m. was fixed as the most satisfactory for these stocks. For lower-grade stocks where softeners are used and there is less rubber, the speed may be increased to give a shorter mixing time with a much lower proportional increase in heat and power consumption.

It was found that for any batch weight or speed which was established it was impossible to mix accelerator and sulphur into the batch in the internal mixer. Most batches permitted the mixture of sulphur at the very end of the mix, although in some it was found advisable to add only accelerator. In any case either the sulphur or the accelerator had to be added to the batch on the batching-out mill. The temperature ranged from 99 to 120 degrees C. on the outcoming stock. The speed was held around 20 r. p. m. The average horsepower was about 130, but the maximum horsepower varied from 175 to 275. The time of mixing from 18 to 30 minutes. This included stocks with gravities from 1.0 to 1.62.

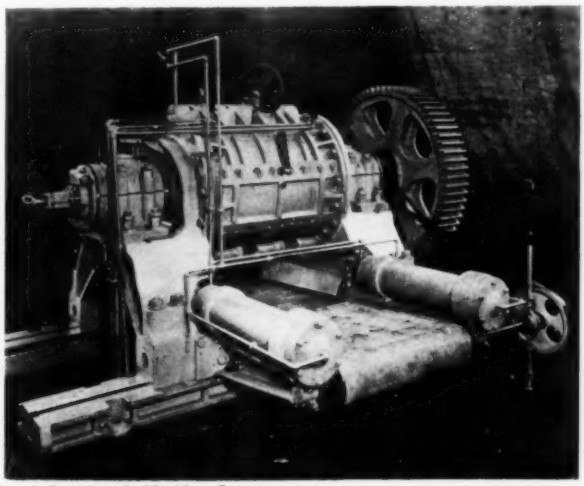
It is interesting to note that although these batches could be mixed without scorching by the addition of accelerator or sulphur, after the batch came out of the mixture the resulting com-

[1] Presented at the Birmingham meeting of the American Chemical Society, April 5, 1922, by R. P. Dinsmore, Goodyear Tire & Rubber Co., Akron, Ohio.

pound was without exception tougher than that regularly mixed on the mills. This toughness is not that of set-cured stock, but of stock in which the rubber has not been sufficiently broken down.

Summary

The ratio of cooling surface to volume of stock being less than for a mill batch and the rate of working being greater, heat is generated sufficiently fast to increase the temperatures considerably above those which are ordinarily obtained in mill work. This renders it impossible to mix an entire batch in the mixer without scorching.



Farrel Foundry & Machine Co.

Farrel Enclosed Mixer With Discharging Mechanism

The resultant mix, although uniform, is tougher than that obtained from a mill. This apparently is due to the fact that the mechanical action is different from that obtained with mill rolls. Rubber softened by heat alone, provided the temperature is not excessive, although apparently much softer when hot, eventually reverts to more nearly its original state than rubber softened by working on the mill. It seems logical to assume that the softening action which renders the mixing of the rubber and compound possible in an internal mixer is chiefly due to the heat generated. This is probably chiefly a decrease in the viscosity of the rubber without any great amount of depolymerization and hence we get reversion or toughness after the batch has cooled off.

An internal mixer is not a complete unit, but requires the use of a mill to slab off the mixed stock. We have made a study of labor and power costs and believe it would be the most economical arrangement to erect a mixer on top of a suitable size mill with an integral drive. This arrangement would permit of dropping the charge directly into the mill rolls, would save trucking and insure rapid cooling of the charge after mixing.

Birmingham Iron Foundry.

Banbury Enclosed Mixer With Feed Hopper

Of the defects mentioned, the first two appear inherent in the internal type of mixer, but the last can be remedied by design. For certain type of stock, particularly mechanical goods, this type of mixer has great advantages over the regular mixing mill. Where a uniform plastic condition of a mixed stock is not highly essential or where fast curing organic accelerators are very little employed, it will undoubtedly be possible to handle high grade stocks satisfactorily. In any event the reduction of the dust nuisance and the saving of labor will make it worth while for every manufacturer to study the mixer in connection with his own particular mixing problem.

HOW TO FIGURE BELT SLIP PERCENTAGE

By W. F. Schaphorst, Copyright, 1922

The following is a simple but accurate rule for finding the percentage of belt slip. Most rules are inaccurate because they do not take the thickness of the belt into account. This rule may not be perfect, but the results may be used as reliable. All measurements should be in inches.

1. Multiply the revolutions per minute of the driven pulley by the sum of its diameter and belt thickness; then by 100.

2. Multiply the revolutions per minute of the driver pulley by the sum of its diameter and belt thickness.

3. Divide (1) by (2) and subtract the quotient from 100. The difference is the percentage of slip.

For example, a 10-inch driven pulley runs at a speed of 360 r. p. m. The belt thickness is 0.25-inch. The 20-inch driver pulley runs at a speed of 200 r. p. m. What is the percentage of belt slip?

Applying (1) we get 360 times 10.25, which is equal to 3,690. Then multiplying by 100 we get 369,000. Applying (2) we get 200 times 20.25, or 4,050; applying (3) we get 369,000 ÷ 4,050 = 91.2; subtracting that from 100 we get 8.8 per cent slip.

In the form of an algebraic formula the rule becomes:

$$\text{Per cent slip} = 100 - \frac{100\ (d + t)\ n}{(D + t)\ N}.$$

Where d = diameter of driven pulley, inches,
t = thickness of belt, inches,
n = speed of driven pulley, in r. p. m.
D = diameter of driver pulley, inches.
N = speed of driver pulley in r. p. m.

ACCESSORY MANUFACTURERS IN BOSTON SHOW

The twenty-first annual Automobile Show of Boston, Massachusetts, will be held in that city March 10-17, 1923, and efforts are being made to make it a most successful one. M. L. Heminway, general manager of the Motor & Accessory Manufacturers Association, states that fifty-one parts and equipment makers have indicated their intention to participate.

READY FOR MAILING. "PNEUMATIC TIRES," by HENRY C. PEARSON. An encyclopedia of tire manufacture, repair, rebuilding, machinery and processes.

New Machines and Appliances

Quick Acting Tire Building Core

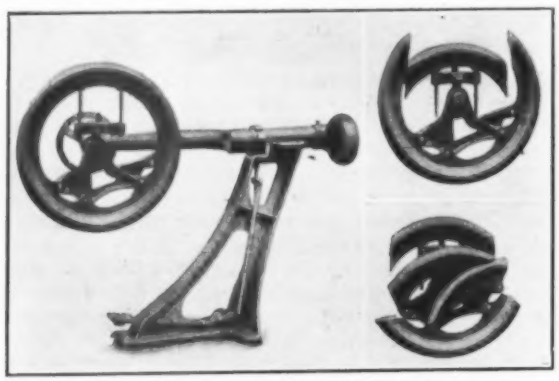
A QUICK acting collapsible cord tire building core which is simple in design and easy of operation is here shown in three views.

The view on the left represents the core mounted on a hand building tire stand, although it can be used equally well for machine building. The core is perfectly balanced and in case of hand building is mounted on roller bearings.

The upper view on the right shows the core ready to be collapsed with the lock section dropping out of place. The right lower view shows the third section dropped out of place, leaving the tire free to be removed. The operation of collapsing the core for removal of the tires is as follows:

The core is set in a vertical plane with the wedge section uppermost. The tire beads are loosened from the cement at the wedge, the lock of the wedge is released, and the section is dropped by its own weight and slid to the rear out of the plane of the core. Revolving the core clockwise about 30 degrees permits the second section to fall out of the tire; further revolution of the same amount allows the third section to fall away, leaving the tire ready to be removed from the core.

Reassembly is effected in the reverse order, except that when the wedge section is ready to go into place the core is turned 180 degrees to allow it to fall into place by its own weight, where it is locked.



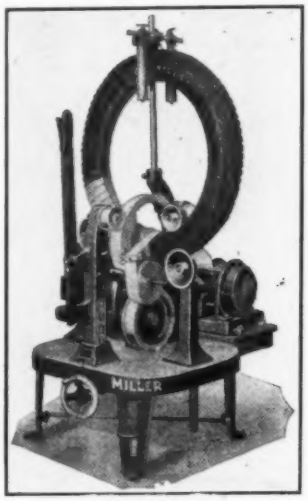
Akron Mold & Machine Co.'s Tire Core

If required, the core can be equipped with a quick change arrangement which allows removal of core and tire complete to a finishing stand in a few seconds. This core is made in all sizes, from 30 by 3 to 36 by 6 inclusive.—The Akron Mold & Machine Co., Akron, Ohio.

Machine for Paper Wrapping Tires

The self sealing tire wrapping machine here illustrated is very speedy and will paper wrap and seal the average tire in about 15 seconds.

The revolving shuttle is hollow and is filled with liquid glue. The paper runs over a small roller attached to the revolving shuttle, and a breaking device over the paper causes the roller to revolve. At one edge there is a narrow roller that runs in glue and distributes it underneath the exposed edge of the paper strip so that when the tire is wrapped it is also completely sealed.



Self Sealer Tire Wrapper

In shipping tires wrapped by this new method they will withstand a great deal more abuse without showing a ragged appearance. There is no part of the package to unravel and a good portion of the paper is saved.—Chas. E. Miller, Anderson Rubber Works, Anderson, Indiana.

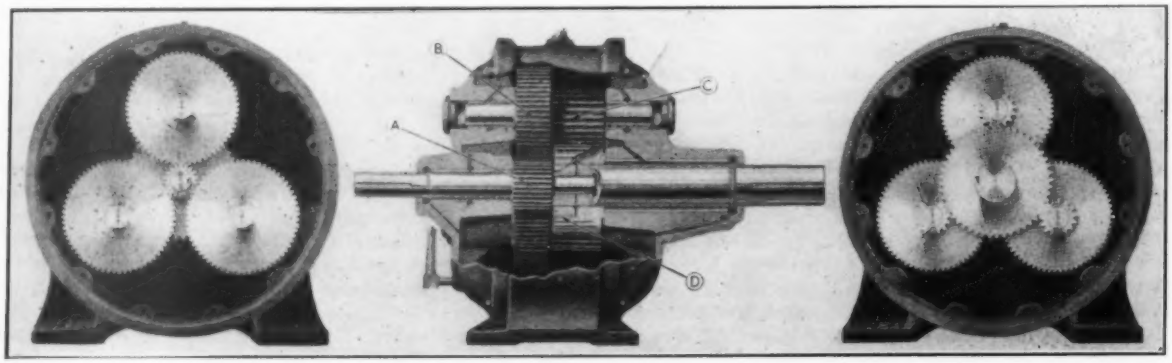
Spur Gear Speed Reducers

In factory practice the problem of stepping down speeds between electric motors and driven machines is constantly met with. In the past pulleys, belts, ropes, open gears, chains, or a combination of such devices have been generally employed.

The modern method employs spur gear reducers shown in the illustration, and is in itself a complete standard unit.

The principle involved in the design consists of the application of a plain spur gear drive combined with the desirable feature of three point contact. All moving parts operate in an oil bath.

Referring to the central figure of the illustration, a central driving pinion A meshes with and drives three countershaft gears B. Three countershaft pinions C, integral with the countershaft



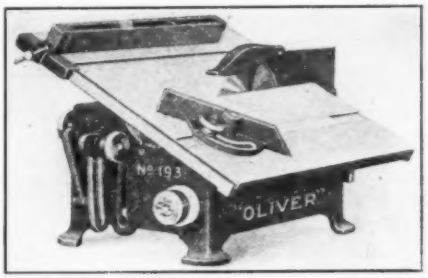
Jones Spur Gear Speed Reducer

gears B, in turn surround and drive a central gear D. The central pinion A is called the high speed pinion, and the central gear D the low speed gear. They rotate in the same direction but at different velocities. The countershaft pinions B and C are equally spaced at angles of 120 degrees around the high speed pinion A and the low speed gear D.

Space forbids enumeration of other details and advantages but it is readily seen that this design is simple as well as mechanically correct and offers a commercial application of practically ideal conditions.—W. A. Jones Foundry & Machine Co., Chicago, Illinois.

Motor Driven Bench Saw

One of the most practical small circular sawing machines obtainable is that shown herewith. The motor is self-contained and mounted in such way as always to keep the belt tight. Both saw and motor are well guarded. The machine has capacity to cut two inches deep with a seven-inch saw operating from an ordinary light socket. The machine may be set as a bench tool or mounted on a pedestal. The table measures 21 by 24 inches, is grooved for sliding cut-off gage, and tilts. A graduated dial indicates at all times the position of the table. A stop is provided for setting the table in the horizontal position, where it is most commonly used.

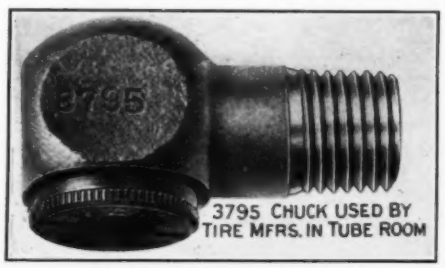


Oliver Motor Driven Saw

These little machines are a great convenience in any woodworking department and in a rubber factory will be found useful for cutting cured slab rubber into blocks either square or beveled as in the case of rubber erasers, for example.—Oliver Machinery Co., Grand Rapids, Mich.

Air Chuck

The air chuck here pictured is said to be the only one that cannot injure the inner mechanism of a tire valve as it will not bend the pin or distort the spring when applied to the valve.



Schrader Automatic Air Chuck

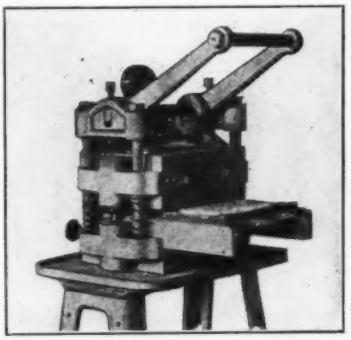
Other additional features embodied in this air chuck are that it is air-tight, and automatically shuts off air when the hose is not in use. There is, consequently, no loss from failure to shut off the air at the tank. The threads of the valve stem do not chafe the rubber washer and cause it to wear down.

The mechanical perfection and durability of this air chuck have led to its adoption by tire manufacturers and make it an economical and efficient instrument in tube testing rooms, and also for service stations which allow their customers free air.

It is made in sizes to fit four diameters of hose, from one-quarter to one-half inch, also in male and female thread pipe sizes.—A. Schrader's Son, Inc., Brooklyn, N. Y.

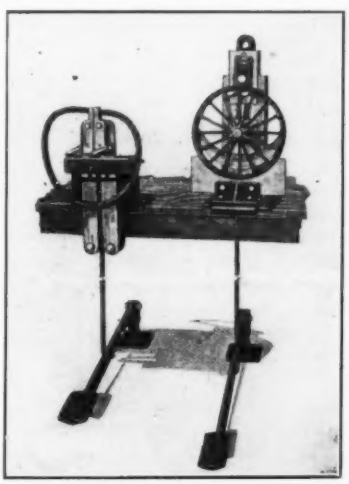
Laboratory Steam Vulcanizer

The illustration pictures a small steam vulcanizer operated by gas. This form is intended primarily for curing rubber stamps from sheet stock. It could easily be adapted for curing laboratory samples for physical testing.



Gas Heated Vulcanizer

The construction of the machine insures a uniform thickness of cured stock. The leverage is very powerful and no trouble will be found in securing adequate pressure. The steam casings are tested to 500 pounds pressure and the machine is equipped with high-class gage and fittings and will vulcanize uniformly over the entire surface. The machine is heated by gas burners fitted to insure the greatest heat with the minimum consumption of gas. Sixty or seventy pounds of steam can be generated in 30 or 35 minutes and maintained at a constant pressure all day at very low cost.—The Edw. H. Adams Co., Providence, Rhode Island.



Tire Wiring and Applying Machines

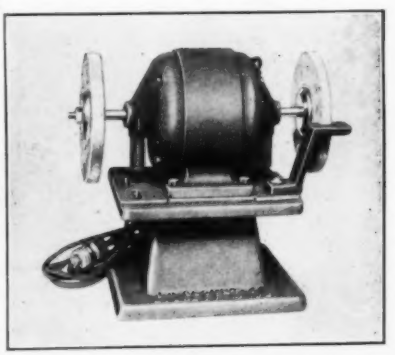
Machine for Applying Small Solid Tires

A convenient tool for applying rubber tires to wheels of baby carriages, wheel chairs, and similar vehicles is here pictured.

It is a convenient foot power bench tool for manufacturer or repair man. It takes any kind of wheel, solid or open spoke, and in sizes from 6 to 16 inches. The illustration on the left is used for wiring and that to the right for applying the wired tire to the wheel rim.—L. G. McKnight & Son Co., Gardner, Massachusetts.

Electric Grinder and Buffer

A special plain bearing combination motor grinder and buff for light work is here illustrated.



Blount Grinder and Buffer

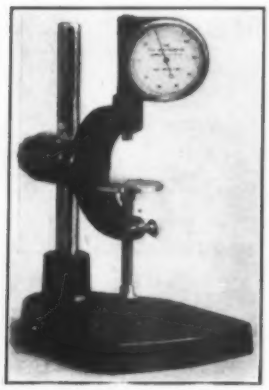
It is equipped with a standard Westinghouse ¼ h. p. 1806 r. p. m. motor for alternating or direct current. There is also included standard grinding wheel, tool rest for right side, buff wheel and attaching cord and plug.

Beside its use for grinding tools, etc., this machine would

prove useful for trimming and polishing molded rubber articles.—J. G. Blount, Everett, Massachusetts.

Indicating Caliper

Accurate grinding operations are frequently required on hard and soft rubber work. A dial indicating caliper of the type here shown will enable one to see the fit instead of feeling for it.



Dial Indicating Caliper

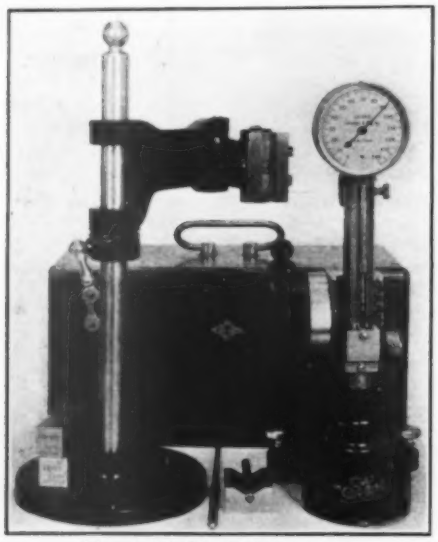
With a sample or gage of the right size between the jaws the pointer is set at zero. The amount of variation from that standard in half thousandths can be instantly read by simply pushing the piece to be tested between the jaws.

This tool can be made more useful in rubber practice in calender and cutting rooms by lifting the plunger, thus making it possible for small samples of uncured sheet stock to be gaged without attenuation of thickness due to handling.—The F. W. Horstmann Co., Irvington, New Jersey.

Recording Scleroscope

The Scleroscope has long been in general use for measuring the hardness of metals and to some extent of vulcanized rubber. It is now provided with permanent indicating mechanism, a pointer hand and graduated dial.

The improved dial instrument is known as the "Model D Recorder." Its indication instead of being momentary remains fixed by the pointer an indefinite length of time, or until the next test is made. The mechanism employed consists of the drop



Shore's Model D Scleroscope

hammer, which functions, by virtue of its accumulated energy of motion, to overcome the penetrative resistance of the metal under test. This absorbs more or less of its striking energy, which is always constant. The energy not absorbed remains available for reacting on or rebounding the hammer itself, and is proportional to the hardness of any metal.

The hammer employed differs from the earlier models in that it is longer, heavier, and drops and rebounds a comparatively shorter distance. The mechanism consists of a sensitive one-way ball clutch and pilot sleeve, which normally holds the hammer at its upper starting position. When released the pilot sleeve falls with the hammer, with the result that the slightest rebound, even though less than one thousandth part of an inch, is instantly fixed by the one-way clutch.

Following this cycle, the clutch assembly is raised up to its starting position, carrying the hammer with it in its now superposed position, due to the percentage of rebound recorded. Simultaneously the hammer, arriving at its upper or starting position, engages and actuates a rack and pinion and hair spring dial mechanism, which in turn faithfully indicates the amount of rebound of the hammer and, therefore, the hardness of the specimen.

The hardness values shown by this instrument agree faithfully with those shown on the vertical scale. The older instrument which is still popular with the trade will continue to be listed by the manufacturers.—Shore Instrument & Manufacturing Co., Van Wyck and Carll street, Jamaica, N. Y.

Machine for Pasting Labels

Every shipping or mailing room connected with a rubber plant requires the convenience of a neat and rapid means of pasting labels for marking parcels, cartons, boxes, etc.

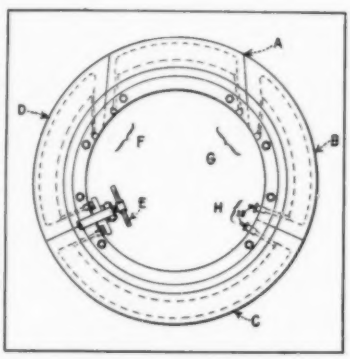
Label Pasting Machine

A simple hand machine for this purpose is illustrated herewith. It can also be arranged for power operation. Labels are pasted by placing them on the table and passing them through the rollers by a forward turn of the handle. The paste is applied from below from a paste feed tank. Its amount is regulated by tightening the roll scraper in the paste box. The machine can be used with almost any variety of paste. The best results, however, are obtained by using a paste suitable to the work in hand.—A. G. Prior, Inc., Newark, New Jersey.

Machinery Patents

Steam Connection for Tire Cores

Steam for curing a tire casing is circulated through the sections A, B, C, D, of a collapsible tire core, of any form, by using a connecting device E, which can be screw clamped to the inner periphery of the assembled core, uniting by tubular connection the inlets and outlets of each adjacent section, arranged in pairs as at E, F, G, and H.



Collapsible Core Connections

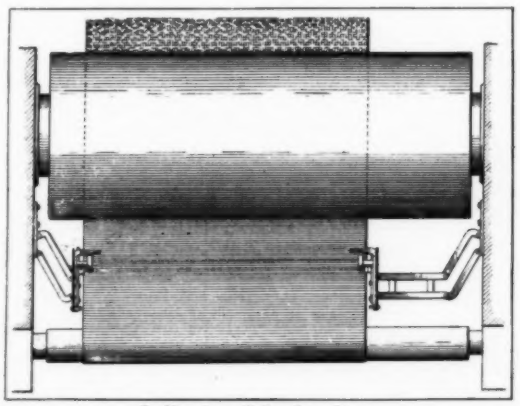
These passages terminate at the inner circumference of the core in sockets provided with bushings adapted to form steam-tight connections with plugs or nipples.

In the case of core sections B and C the adjacent passages are

provided with fittings whereby steam may be admitted and withdrawn from the chambers or sections.—Charles H. Desautels, assignor to the Fisk Rubber Co., Springfield, Massachusetts. United States Patent No. 1,434,431.

Gage for Calendered Rubber Stock

A plan view is here shown of sheet material passing under a calender roll and over a wind-up shell. Attached by brackets to



Indicating Calender Gage

the frame of the calender on either side is a gage for continuously measuring the calendered stock. The measuring device is comprised essentially of a pair of rollers between which the calendered sheet passes. The thickness of the passing sheet is shown by an index pointer on a calibrated scale. By means of a compound leverage the thickness is magnified so that thousandths of an inch can be easily read on the scale.—E. D. Putt, assignor to The Firestone Tire & Rubber Co., Akron, Ohio. United States patent No. 1,437,117.

Other Machinery Patents

The United States

1,441,079 Inner tube testing device. C. D. Grady, assignor of ½ to E. E. Wallace—both of Sturgis, Ky.

1,441,603 Method of and apparatus for making hollow rubber articles. A. L. Schavoir, Stamford, Conn.

1,441,649 Expansible metallic core for curing pneumatic tires. E. Wright, Dayton, Ohio.

1,441,767 Machine for making automobile tire casing carcasses. W. E. Williams, Chicago, Ill., assignor to The Firestone Tire & Rubber Co., Akron, Ohio.

1,442,226 Vulcanizing valve. H. P. Kraft, Ridgewood, N. J.

1,442,519 Tire remover. M. P. Breon, assignor to C. L. Breon—both of Newport News, Va.

1,442,612 Solid tire grooving machine. A. Hargraves, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.

1,442,653 Machine for building cylindrical tire blanks. B. De Mattia, Clinton, N. J.

1,443,189 Platen for vulcanizing presses. A. C. V. Malm, Lansdowne, Pa., assignor to E. W. Bliss Co., Brooklyn, N. Y.

1,443,300 Tire rim expanding and contracting implement. A. J. West, Andrews, S. C.

1,443,303 Cutting device for pneumatic tires. C. York, Memphis, Tenn.

1,443,324 Tubing machine. B. F. McGovern, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio.

1,443,327 Clicking machine block. W. L. Tourtellot, assignor to The Goodyear Tire & Rubber Co.—both of Akron, Ohio.

1,443,369 Tire building machine. H. V. Lough, assignor to The Hartford Rubber Works Co.—both of Hartford, Conn.

1,443,495 Machine for pulling treads from tires and for separating plies of fabric. B. E. Maxwell, Wichita, Kans.

1,443,939 Tire building apparatus. F. F. Brucker, assignor to The Miller Rubber Co.—both of Akron, Ohio.

The Dominion of Canada

227,098 Machine for cutting disks from sheet materials. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Conn., U. S. A.

227,108 Tire alarm and gage. The K. S. Conrad Co., Inc., assignee of W. A. Harris—both in Greenville, S. C., U. S. A.

227,317 Wheel and demountable rim. The Firestone Steel Products Co., assignee of J. G. Swain—both of Akron, Ohio, U. S. A.

227,319 Valve housing for pneumatic tools. The Independent Pneumatic Tool Co., Chicago, assignee of A. Levedahl, Aurora—both in Ill., U. S. A.

227,322 Mold for cushion tires. The K., F. & C. Tire & Rubber Corporation, assignee of F. A. Krusemark—both of Roanoke, Va., U. S. A.

227,334 Demountable rim. J. S. Culp and F. M. Case, assignee of ⅓ of the interest—both of Cleveland, Ohio, U. S. A.

227,616 Manufacture of pneumatic tires. The Dunlop Rubber Co., Limited, Regent's Park, London, assignee of Colin MacBeth, Birmingham, Warwick—both in England.

227,620 Mold for air tubes for pneumatic tires. The T. B. McLeroth (Tubes) Limited, assignee of T. B. McLeroth—both of London, England.

227,816 Mold opening device. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of W. Finn, Detroit, Mich., U. S. A.

227,817 Self stripping mold. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of A. Y. Tucker, Milwaukee, Wis., and I. A. Watrous, Stratford, Conn.—both in the U. S. A.

227,822 Fabric cutting and winding apparatus. The Goodyear Tire & Rubber Co., assignee of A. H. Koza, both of Akron, Ohio, and W. C. Tyler, Racine, Wis.—both in the U. S. A.

227,823 Tire machine. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio, U. S. A.

227,880 Tire inflating apparatus. L. L'Heureux, Montreal, Quebec.

The United Kingdom

188,830 Tire pressure gage. A. B. Low, 745 Columbine street, Denver, Colo., U. S. A.

188,856 Molding hard rubber pipe stems. J. Hubbard, 35 Norfolk Road, Seven Kings, Essex, and A. P. Crouch, 106 Cannon street, London.

188,917 Machine for cutting the jointing strip of tire covers. F. A. Byrne, 342 Shaftmoor Lane, Hall Green, Birmingham.

189,569 Dental rubber heater. J. D. Bowling, 647 London Road, Westcliffe, Essex.

Germany

Patents Issued, with Dates of Issue

369,275 (November 24, 1921). Mechanism for indicating the deflation of pneumatic tires. Robert Bosch A.-G., Stuttgart.

369,658 (March 15, 1922). Rolling mill for rubber and similar masses. Bror Rohlin, Kochstrasse, 6-7, Berlin.

Design Patents Issued, with Dates of Issue

834,782 (November 15, 1922). Dipping apparatus for making rubber goods. Ernst Rohlin, Motzstrasse 71a, Berlin.

Process Patents

The United States

1,440,371 Process and apparatus for treating rubber. G. B. Britton, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.

1,440,961 Process for vulcanizing rubber and products obtained thereby. S. M. Cadwell, New York City, assignor to The Naugatuck Chemical Co., a Connecticut corporation.

1,440,962 Process for vulcanizing rubber and products obtained thereby. A. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., a Connecticut corporation.

1,440,963 Process for vulcanizing rubber and products obtained thereby. A. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., a Connecticut corporation.

1,440,964 Process for vulcanizing rubber and products obtained thereby. S. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., a Connecticut corporation.

1,441,514 Apparatus and method for forming tires. J. T. Lister, Cleveland, Ohio.

1,442,357 Art of manufacturing water bottles. J. W. Patterson, assignor to The Seamless Rubber Co., Inc.—both of New Haven, Conn.

1,442,518 Process of making pneumatic crutch pads. J. J. Bowers, San Francisco, Calif.

The Dominion of Canada

227,287 Method of working quick rubber curing compounds. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of W. A. Gibbons, New York City, U. S. A.

227,815 Apparatus for treating latex. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. E. Bradley, Montclair, N. J., and J. C. Coffin, Hempstead, Long Island, N. Y.—both in the U. S. A.

United Kingdom

190,099 Process for removing the moisture from latex by spraying. General Rubber Co., 1790 Broadway, assignee of C. E. Bradley and J. G. Coffin, 561 West 58th street—both of New York City, U. S. A. (Not yet accepted.)

The Editor's Book Table

Book Reviews

"RUBBER—THE PRODUCT WITH A 1001 PURPOSES." ISSUED BY The Propaganda Department, Rubber Growers' Association, Inc., 2-3-4 Idol Lane, Eastcheap, E. C. 3, London, England. Paper, 72 pages, 6 by 9 inches.

IN this compactly arranged and fully illustrated little bulletin an attempt has been made to tell the story of rubber, one of the world's greatest industries. It is a tale of romance also, for it recounts the adventures of pioneers, the labors of scientists and the dreams of inventors. The bulletin aims to show what an indispensable commodity rubber has now become and how greatly its uses have developed in recent years.

Some of the more important divisions of the pamphlet are headed: "Rubber in the Motor Industry," "Rubber in Electrical Engineering," "Rubber in the Home," "Rubber in the Sick Room," "Rubber and Athletics," "Rubber for Footwear," "Rubber Floor Coverings," "Some Lesser Known Uses to Which Rubber Can Be Applied." The propaganda department of the association invites suggestions regarding new uses for rubber, and states that all such communications will be held in strict confidence.

"HANDBOOK OF CHEMISTRY AND PHYSICS." BY CHARLES D. Hodgman and Norbert A. Lange. 9th edition, 1923. Chemical Publishing Co., Cleveland, Ohio. Cloth, flexible covers, 803 pages, 4 by 7 inches, with index.

This valuable handbook embraces an extensive compilation of tabulated data on mathematics, chemistry, and physics for students and practicing chemists and engineers. The work increases in size, accuracy, and scope with each successive revision.

"PLASTICS AND MOLDED ELECTRICAL INSULATION." BY Emile Hemming. The Chemical Catalog Co., Inc., New York, N. Y. Cloth, 6 by 9 inches, indexed, illustrated.

The author of this book presents a very interesting and valuable account of the technology of the plastics industry, embracing two parts. Part I covers ceramic products, calcareous cements and artificial stones, glass, casein products, plastics in road construction, and sundry patent references. Part II considers the history of molded insulation, raw materials employed, classification of molded products, molds and dies, selection of materials, and properties and relative characteristics. Nearly every chapter in the book concludes with voluminous classified patent references on the topics treated in the chapter. Every reference comprises a concise yet comprehensive abstract of the patent. This feature of the book is of great value to chemist or engineer working in any of the divisions of diversified plastic industry.

The author is well known as the leading authority in the field of cold molded plastics, the process for which he invented and introduced in America in 1908. The book is a distinct and valuable contribution to the technology of plastics and plastic molding.

"THEORETICAL AND APPLIED COLLOIDAL CHEMISTRY." BY Dr. Wolfgang Ostwald. Translated by Dr. Martin Fischer. Second edition. John Wiley & Sons, New York, N. Y., 1922. 278 pages, 6 by 9 inches, illustrated and indexed.

This work by an acknowledged leading authority on colloid chemistry is now in its eighth German and second American edition. It has been carefully revised and enlarged in the present edition, in the preface to which the author emphasizes again that the volume is only a stimulus to the seeing of colloid phenomena for oneself.

The book comprises five lectures covering: Fundamental Properties of the Colloidal State; Classification of the Colloidal State; The Changes in State of Colloids; Some Scientific Applications of Colloid Chemistry, and; Some Technical Applications of Colloidal Chemistry.

"COTTON FACTS." REVISED AND ENLARGED BY C. W. SHEPperson, Published by Shepperson Publishing Co., New York, N. Y., 1922. Cloth, 164 pages, 4 by 7 inches.

The forty-seventh annual edition of "Cotton Facts" contains a great deal of valuable data, including a series of statistical tables regarding the world's cotton production and consumption, the figures in many instances covering a number of years. Prospects for the season 1922-23 are also included, while a chart showing the fluctuations in recent years of prices of spot cotton at Liverpool, New York, and New Orleans forms another interesting feature.

"PROPERTIES OF ELECTRICAL INSULATING MATERIALS OF THE Laminated Phenol-Methylene Type." By J. H. Dellinger and J. L. Preston.

This is Technologic Paper No. 216 of the Bureau of Standards and includes sections devoted to description of laminated phenolic insulating materials, the properties measured, tabulation of results, and discussion of results. In the last mentioned section is a tabulated comparison of properties of hard rubber, vulcanized fiber, laminated and molded phenolic insulating materials.

"EXPORT MERCHANDISING." BY WALTER F. WYMAN. McGRAW-Hill Book Co., Inc., New York and London, 1922. Cloth, 405 pages, 6 by 9 inches.

The author of this up-to-date volume is not only the sales and export manager of an important American firm, but has also served as a member of several leading trade conferences, as well as writing certain authoritative books on modern export selling practice.

The volume under consideration includes a survey of export trade in general, a summing up of the main features to be considered in the formation of a company's export department, and suggestions concerning the work of salesmen. Typical chapters are headed: "How Advertising Gets Foreign Trade," "Developing Export Trade by Correspondence," "Typical Export Sales Campaigns" and "The Fundamentals of Foreign Credits." In one of these chapters is an interesting account of the methods used by the export department of the Miller Rubber Co., Akron, Ohio. Illustrated and well indexed, this volume clearly presents the leading features of export merchandising.

"HANDBOOK FOR 1921 OF THE STATE OF BRITISH NORTH Borneo." Compiled from reports of the Governor and staff of North Borneo. Published by The British North Borneo (Chartered) Co., London, England. Illustrated. Cloth, 112 pages, 6 by 9 inches.

Some interesting items regarding a comparatively little known branch of the rubber industry appear in the 1921 Handbook of the State of British North Borneo. Regarding attempts to establish rubber plantations in the island, nothing of importance was accomplished until the year 1905, when during that year, and up to the year 1910, twelve companies were formed. In 1907 only 4,975 pounds of rubber were exported, while shipments in 1919 had increased to 8,823,422 pounds. At the end of 1919, 29,970 acres were being tapped, the bulk of the land planted belonging to 23 companies with a total capital of nearly £3,500,000. Most of the companies are British, although a few large estates are owned by Chinese and Japanese, and there are small native holdings.

Exports of gutta percha have gradually decreased, perhaps due to wasteful methods of collection of the material. There are eleven kinds of jungle rubber recognized in North Borneo, the

largest export of these forest products for any single year being in 1904, when the value represented over $100,000.

"GOVERNMENT OF THE GOLD COAST—REPORT ON THE AGRICULTURAL Department for the Year 1921." Published by the Government Press, Accra, Gold Coast, Africa. Paper, 78 pages, 8 by 13 inches.

Among the various crops mentioned in this bulletin some space is given to notes regarding rubber cultivation, although it is noted that since 1920 tapping has been practically discontinued, both by the natives and at the agricultural stations. With the return of better prices some revival may be expected of this industry which was first established in the Gold Coast and Ashanti in 1880. At one time the value of the production was from £300,000 to £500,000 annually, but there has been a gradual decline, while the wild trees have been most ruthlessly treated and killed. The Pará rubber trees planted in this division of Africa are said to be making excellent growth.

Abstracts of Recent Rubber Articles

Natural and Synthetic Caoutchouc. Dr. F. Kirchhof concludes that pure Pará rubber has the formula C_{16} H_{17}, while artificial caoutchouc, and some Congo rubber has the formula C_{10} H_{16}. This difference of constitution would account for the technically important differences in the properties of the two rubbers and also for well-known differences in certain characteristic reactions, especially with respect to ozone. Only very careful analyses of pure substances can settle the question of the 16 or 17 hydrogen atoms, but Kirchhof's suggestion may lead to synthetic rubber researches being conducted in a new direction.—Dr. F. Kirchhof, *Kolloid Beihefte*, September, 1922.

The Constitution of Rubber. A new conception of the chemical constitution of rubber, with a review of experimental work. Contribution from the School of Engineering Research, University of Toronto. Paper presented at meeting of the Royal Society of Canada, Section III, May, 1922, by Maitland C. Boswell, Associate Professor of Organic Chemistry, University of Toronto.—*The India Rubber Journal*, December 9, 1922.

The State of Rubber in Its Solutions. Paul Bary. *Le Caoutchouc et la Gutta Percha*, 19, 11393-5, 1922.

The History of Synthetic Rubber. Information is given in the controversy over the priority in the synthesis of rubber from isoprene.—C. Harries, *Zeitschrift für Angewandte Chemie*, 33, 1, 226-7.

Rubber Varnishes. Formulas are given for the preparation of varnishes and paints having a rubber and resin base in various solvents and vehicles (spirits of turpentine, linseed oil, camphor oil, benzene, ethyl ether, petroleum, carbon bisulphide, etc.), so-called rubber varnish (prepared from slightly saponified linseed oil), and for varnishes to be applied to rubber articles.—W. Hacker, *Chimie et industrie* 8, 641 (1922).

Caoutchouc. Discussion of the constitution of the caoutchouc molecule based on a study of caoutchouc catalytically hydrogenated when dissolved in dilute solution in hexahydrotoluene.—R. Pummer and P. A. Burkard, *Berichter der Deutschen Chemischen Gesellschaft*, 1922, 55, 3458-3472.

Comparative Tests with Rubber Compounded with Sulphur and Litharge. Comparative tests on the rate of vulcanization of mixtures of rubber with sulphur, with or without the presence of litharge, the rubber having been prepared or packed under different conditions, showed that litharge obliterates irregularities in the rate of vulcanization due to the use of varying proportions of sodium silicofluoride, but increases the differences arising from the effect of moisture and mold. The latter influence is probably related to the known connection between the activity of litharge and the acetone-soluble constituents of rubber.—H. P. Stevens, *Bulletin of the Rubber Growers' Association*, 1922, 4, 520-522.

Method for Estimating Volatile Substances in Air of Rubber Factories. The method for determining the proportion of light petroleum vapor contained in the air of rubber factories, consists in freezing out the light petroleum in two weighed U-tubes, packed with magnesium turnings and cooled by immersion in liquid air. Before being passed through these tubes, the air is freed from dust, moisture and carbon dioxide by passage through tubes containing, in order, soda-lime, calcium chloride, phosphoric anhydride, and cotton wool.—E. Fritzmann and K. Macjulevitsch, *Journal of the Russian Physical and Chemical Society*, 1920, 52, 212-226.

Experiments on the Tearability of Rubber. Mixtures of rubber and excess of sulphur were made containing also zinc oxide, refined china clay, or light magnesium carbonate, one set of batches including these ingredients in equal proportions by weight and another set in equal volume proportions. Accelerated mixings of the latter type were also prepared. From each mixing strips were formed and united by vulcanization. Measurement was then made of the load necessary to effect the separation of the joined surfaces. The mixings containing zinc oxide showed greatest resistance to tearing, and the clay mixings least. The direction of the grain in the test pieces had no appreciable influence on the results. Under-vulcanization increased the ease of separation or tearing. The effect of the organic accelerator was to make separation more difficult.—B. B. Evans, *India Rubber Journal*, 1922, 64, 815-819.

New Trade Publications

THE NATIONAL AUTOMOBILE CHAMBER OF COMMERCE, 366 Madison avenue, New York, N. Y., has recently issued its twentieth annual "Handbook of Automobiles—1923." As usual there are complete specifications and illustrations of the various cars and trucks listed, which include 154 passenger automobiles, 69 commercial cars and trucks, and 6 electric vehicles, as produced by leading manufacturers who are members. The introduction to the handbook not only mentions the names of members constituting the various committees of the organization, but also lists the manufacturing companies, with the trade names of the cars or trucks they produce.

OF INTEREST TO THE AMERICAN EXPORT TRADE IS THE RECENT publication by the Department of Commerce of a compilation entitled "Steamship Services from United States Ports." Much necessary information, hitherto unavailable, can be found in this pamphlet, which is sold for fifteen cents (money order or coin). Copies can be secured through the cooperative offices of the Bureau of Foreign and Domestic Commerce, or by applying directly to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Judicial Decisions

O'SULLIVAN RUBBER CO. vs. GENUINE RUBBER CO., ET AL. District Court, District of Massachusetts. June 24, 1922. No. 1591. In equity. On entry of decree after mandate.

In judging this case the Court of Appeals has decided that the plaintiff is making "monopoly claims," and that it should recognize the right of a competitor to name and advertise its output in the language of its trade. Under all the circumstances, full justice will be done to the plaintiff by issuing an injunction comformable to the mandate from the Circuit Court of Appeals, with costs to the plaintiff.—*Federal Reporter*, Volume 281, No. 5, page 851.

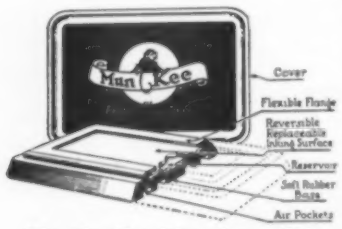
ACTING DIRECTOR BUREAU OF STANDARDS

Dr. F. C. Brown has been recently chosen by Mr. Hoover, Secretary of Commerce, to serve as acting director of the Bureau of Standards. Dr. Brown has been previously engaged in administrative duties in connection with the bureau, and also in various lines of research work.

New Goods and Specialties

Stamp Pad with Rubber Base

THE pneumatic base which is one of the features of the stamp pad shown in the illustration makes the stamping operation noiseless and protects the surface of the highly polished desk from scratches. On the under side of the base there are air pockets which form a vacuum and prevent the pad from slipping, even on the sloping desk of the bookkeeper. The filler of the pad is reversible, so that it is really two fillers in one, and it may be replaced for a small sum when worn out. Under the filler is a removable reservoir of the best quality of felt, which spreads the ink evenly from beneath when the filler is pressed down upon it. This saves the trouble of frequent re-inking and insures the proper amount of ink for a clear impression. Replenishing the reservoir is accomplished by simply inserting the nose of the "Mun-Kee" ink can under the edge of the filler and squirting the ink onto the felt. No ink is wasted in the process and the pad is ready for immediate use.—Mun-Kee Products Corp., Los Angeles, California.



The Mun-Kee Silent Stamp Pad

Novel Rubber "Ball"

The unusual design of "play" ball illustrated here, with its ten points and twelve faces, has been named the "Poly-Cal" by the manufacturer, to indicate that it involves many calisthenic exercises. It is made of solid white rubber, has a tremendous bounce, and never lands in the place where it is expected. It is intended for children's play on the streets or in back yards as well as for gymnastic exercise for adults. Several games are suggested by the manufacturer, in which any number of players may take part, either children or adults. In fact it will lend itself to any plan of amusement that calls for much lunging, jumping, and chasing.—J. Abrahams, 501 Main street, Bradley Beach, New Jersey.

Poly-Cal Athletic Ball

Anti-Rattlers for Automobiles

With the increasing popularity of closed car models, the anti-rattlers designed to eliminate the noise of windows are becoming more and more in demand. In the one illustrated the metal parts are heavily nickeled brass and an ornamental appearance as well as neatness is assured. They are made in many styles and with any kind of base desired. The length of the screw from the rubber tip to the head may be either 1 inch, 1-1/16, 1¼, 1-5/16, or 1⅜ inch. They are packed in cartons of fifty.—Autoquip Manufacturing Co., Inc., Rochester, New York.

Lock-Type Anti-Rattler

THE "FAIRY KISS" POWDER PUFF, MANUFACTURED BY THE KELTON Rubber Co., 126 Wellington street West, Toronto, Canada, uses a rubber bag to hold the puff, and the trade mark is registered.

New Air-Tight Valve Core

In the valve core illustrated here the points emphasized are that the pin is always centered in the end of the stem and will not bend; that in the barrel the long special threads will not freeze in the stem; the air passage is large so that the tires fill rapidly; there is a metal stop so that there is no danger of screwing down too far. The compression ring is of heavy, tough composition and cannot peel or cut; it adjusts itself to any stem and forms "leak-proof" seal in all stems. The valve seat is of live rubber and makes perfect seat. These cores are put up in metal containers so arranged that each core lies in a separate groove, to protect the threads.—The Wedler-Shuford Co., St. Louis, Missouri.

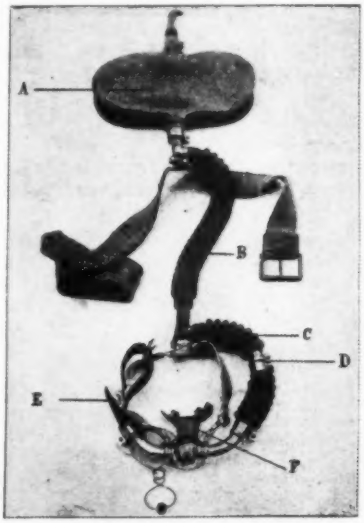
"Wedford Air-tite"

Apron for Workers in Acids

A ready market should be found for the "Invincible Acid Apron," made from a fabric which withstands the action of all kinds of acids, including sulphuric. It has great strength of fiber and is moderate in cost. It is furnished with a neck tape and an adjustable chain fastener at the waist. Sleeve protectors and leggings are provided from the same material.—The Defiance Welding Co., Defiance, Ohio.

Rubber Apparatus for Sponge Fishing

The Fernez diving apparatus here pictured is intended to replace the ordinary diving suit in sponge fishing. Its outstanding feature is the simplicity which makes it possible for the diver to adjust it to his body in a few seconds. An air pocket A is suspended from the belt which fastens around the waist, and connected with this air pocket is a long rubber tube which leads to a double handled pump. The flexible tubing B reaches up the diver's back and connects with another tube C which straps around the diver's neck after he has clenched the mouthpiece F between his teeth. An inhaling and an exhaling valve D and F respectively are provided, through which the diver breathes. The adjustment is completed by the diver placing the clip on his nose.



"Sponges." By E. J. J. Cresswell

Fernez Diving Apparatus

This apparatus is not only much lighter in weight and less restricting to the movements of the diver but it is also less expensive. Successful experiments have been carried on with it at depths of twenty to twenty-five fathoms, though naked divers can work only a few minutes at such a depth on account of the cold.—Maurice Fernez, 40-42 Rue de Vitry and 1-3 Rue d'Alsace-Lorraine, Alfortville (Near Paris) France.

Heavy Rubber-Soled Shoe Without Laces

The illustration shows very clearly the special features of this sturdy rubber-soled shoe. It is called the "Strap-Way" because of the fastening. A strap is attached to the overlapping front of the shoe, which passes around the ankle, drawing in the leather leg portion snugly, and closes with a buckle at the top of the shoe in the back. It combines perfect protection from snow and rain with neatness of appearance, and the straps may be adjusted in a minute. They are strong and durable,—no broken or frozen laces to bother with. These shoes may be had in black or tan leather tops, attached inside or outside duck bottoms, plain or rolled edge, gray sole, white foxing, and black uppers.—Gutta Percha & Rubber, Limited, 47 Yonge street, Toronto, Canada.

"Strap-Way" Leather Top Stub Proof Shoe

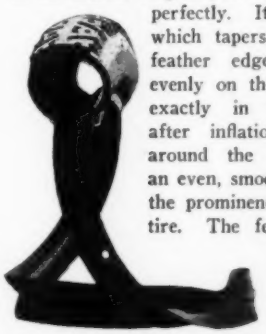
Rubber Soles of One and Two Units

The Clico sole, shown in the accompanying illustration, is made of pure Ceylon crêpe rubber. The manufacturers claim for it that it is 60 per cent lighter than the ordinary rubber sole and 30 per cent lighter than leather; that it will not come off when the sole is worn; will not "squash out" or curl around welt, and that it has a fine, firm, close grain which permits of perfect cementing and stitching. These soles are made in gages from ⅛ to 3/16-inch. In the two-unit models the heels are furnished separate, not molded as a part of the sole. The first unit is cemented and stitched to the leather slip sole; then the second unit is cemented to the first. The advantage of this over the single unit model is that the stitching does not show on the surface. The single unit soles are preferred for women's shoes. Another feature is the special adhesive which is supplied to the cementing side of the sole, insuring a perfect cementing job.—The Clifford Co., 185 Summer street, Boston, Massachusetts.

The Clico Sole

A New Tire Flap

The tire flap shown in the illustration is molded to V-shape in an endless ring and is designed to fit the contour of the tire perfectly. It consists of a stiffening center rib which tapers away in two dished sides to fine feather edges. This thick center rib rides evenly on the rim between the beads, being set exactly in the center position, during and after inflation. The dished sides fit evenly around the contour of the beads, presenting an even, smooth surface to the tube, regardless of the prominence of the bead projection inside the tire. The feather edges prevent chafing action against the tube and there is no danger of tube pinching even though the edge of the flap is turned over temporarily. These flaps are made in sizes ranging from 30 by 3½ to 40 by 8.—American Rubber & Tire Co., Akron, Ohio.



The RUBUR Flap

Clincher Cord Tires in Ford Sizes

The Pennsylvania Red Square Vacuum Cup Clincher cord tires are now being made up in Ford sizes. This announcement will no doubt be met with hearty appreciation because of the high quality of the product and also because of the moderate price, which makes the change from fabric to cord equipment an actual economy.—Pennsylvania Rubber Co., of America, Inc., Jeannette, Pennsylvania.

Vacuum Cup Clincher Cord Tire

The Studebaker-Wulff Cord Tire

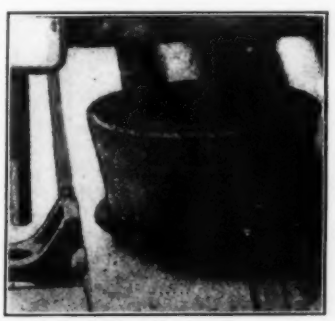
The Studebaker-Wulff Rubber Co., which has been continuing the large oversize cord tire design of the Marion Tire & Rubber Co., whose factory it acquired, is now developing a new cord tire of the 30 by 3½ size, which in size and weight is half-way between the recent standard of cord and fabric construction and is only slightly higher in price than the fabric tires.—Studebaker-Wulff Co., Marion, Ohio.

Bounder for Exercise and Amusement

The "Bounder," an amplification of the popular jumping stick, carries the idea out of the class of toys for children and makes of it a device for physical culture exercise for adults as well. The "Bounder" is made in four sizes, with carrying capacity ranging from 40 pounds to 225 pounds. The main post or pole of the "Bounder" is of special alloy steel tubing, either enameled in colors or nickel plated. The foot base is of reinforced corrugated aluminum alloy, light but strong. The sliding post is a square steel tube with a reinforced aluminum base fitted with a Pará rubber tip. The hand grip is of tan cowhide. The spring is of tested steel and is indestructible.—Patents Manufacturing Co., 878 Broadway, New York, N. Y.

Rubber Buffers Between Body and Chassis

To insulate the automobile body from the chassis and to protect the former from frame distortions, the Daimler company's practice is to support the body at four points, two front and two rear, with intervening rubber buffers as seen in the illustration. In the future the system of anchorage to the chassis frame will comprise rubber buffers at one end and a hinge at the other end.—The Daimler Co., London, England.

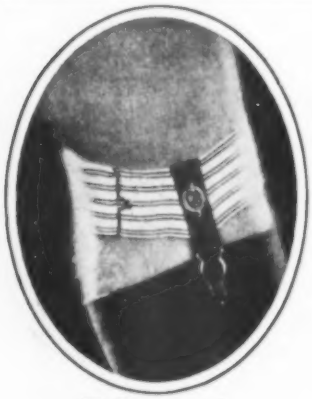


The Daimler Body Spring

Heavy Duty Inner Tube

The Mason heavy duty inner tube is of glossy black rubber, and the manufacturers claim that it will stand remarkable aging and service tests, will not tear when punctured, and can be repaired almost endlessly.—The Mason Tire & Rubber Co., Kent., Ohio.

AMONG MANUFACTURERS OF SPORT SHOES WHO ARE FURNISHING as original equipment the "Rajah" crêpe rubber sole and heel made by the Alfred Hale Rubber Co., Atlantic, Massachusetts, is The Preston B. Keith Shoe Co., of Brockton, in the same state.



"Padless Garter"

Men's Padless Garter

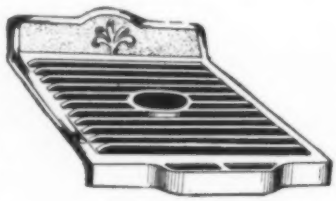
A new "Padless Garter" for men is pictured here. The manufacturer claims that it is light, cool, and efficient. It may be had with either wide or narrow band of good quality elastic.—Wilson Bros., 528 South Wells street, Chicago, Illinois.

Hartland Hat Carrier

The "Hartland Carrier," to attach to autos or closet doors and under shelves, will hold small packages or two hats. It is supported by vulcanite ends between which stretch two soft rubber cords, all dull black.—Hartland Co., Inc., 1974 Broadway, New York.

Combination Rubber Mat and Step-Plate

Very ornamental as well as serviceable is the "Nifty Mat" shown here. It is a combination of an aluminum step-plate and rubber mat and scraper which is easily attached to the running board of any type of automobile. It is 11¼ inches wide and 9¾ inches deep and weighs about two pounds. The rubber mat is removable so that it may be renewed when worn. The step-plate is provided with kick plates reinforced with two supports on the back to prevent breaking. It may be had in a satin finish which will not tarnish, or in a highly polished finish.—American Aluminum Match Plate Co., 79th at Kinsman Road, Cleveland, Ohio.



The "Nifty Mat"

Steel Blowout Boot

Broughton Blowout Boot

Broughton's steel blowout boot for both clincher and straightside tires can be used to reinforce any length of blowout, rim cut, or bruise. If the injured section is several inches long, two or more boots may be used side by side.—The Geo. H. Broughton Co., 122 Wellington street West, Toronto, Canada.

Seamless Bias Tape

The manufacturers of Irvington seamless bias varnished cambric tape, enumerating the advantages of the seamless tape over sewed, state that (1) it can be wound continuously, without the necessity of stopping to cut a seam; (2) there are no air pockets as in sewed tape and consequently no lowering of dielectric at seam joinings; and (3) it can be wound with lap instead of butt joint. This tape comes in 36 and 72-yard rolls and is 2 inches or more wide, with thickness of .005 to .015 inches.—Irvington Varnish & Insulator Co., Irvington, New Jersey.

A Non-Sticking Battery Tester

Kant Stick Battery Tester

The materials entering into the construction of the "Kant Stick" battery hydrometer shown in the accompanying illustration are of the best. It has a molded pear-shaped glass barrel, and a float of the pendulum type made with a diamond point shot-weighted bottom which insures accurate and instantaneous reading. The rubber parts comprise a bulb of the best grade of red rubber, a square collar to prevent rolling when the hydrometer is placed on a flat surface, and a soft rubber pipette. The rubber bulb on one end and the square collar of rubber on the other lessen the danger of breaking, also, if the instrument should be dropped.—Scranton Glass Instrument Co., 322 N. Washington Avenue, Scranton, Pennsylvania.

Slipless Cord Cone Belt

The Goodyear cord cone belt was developed for the cone drives of textile machines such as slubbers, intermediate, roving frames, and jack frames. These belts hold the cones in a flexible but slipless grip, and they do not stretch or break. They wear well, and their ultimate cost is less than that of leather belts.—The Goodyear Tire & Rubber Co., Akron, Ohio.

Three New Tires in the Republic Line

The Republic Rubber Co. is featuring three tire units, practically new in design and construction. The "Grande" cord is a full oversize tire with a generous air capacity and an improved tread design which insures greater mileage. The center row of studs in the tread design has been converted into a center running strip, and circumferentially around the tire and between the other four rows of studs the effect of a supplementary ribbed tread has been produced, which increases the strength of the tire, gives more tread rubber, and eliminates the danger of tread separation. The tread rubber runs from bead to bead.

The new "Republic" Cord is an extension of the line to include sizes 30 by 3½ to 34 by 4 inclusive. These sizes make it possible for this tire to be used to replace fabric tires one by one, without throwing a car out of balance, misalinement being impossible. The tread design is identical in every way with that of the Grande cord, and this also has the non-blooming tread stock from bead to bead.

The "Eagle" cord, which is in sizes ranging from 30 by 3½ to 35 by 5, excluding 31 by 4 and 36 by 4½, has the same general

Grande Cord Republic Cord Republic Eagle

construction and finish as the Grande cord except the tread design. This tire has three rows of sturdy staggered studs, with reinforcing perpendicular side beading placed immediately under the studs.—The Republic Rubber Co., Youngstown, Ohio.

Activities of The Rubber Association of America

R. G. A. Committee Visits United States

REFERENCE was made in the February issue of THE INDIA RUBBER WORLD to the arrival on January 17 in New York City of the committee sent to this country by the Rubber Growers' Association of London, England, for the purpose of holding a consultation with American representatives of the industry concerning existing crude rubber restrictions. Mention was also made of the conference on January 19 with a special committee appointed by The Rubber Association of America, Inc., at which time crude rubber consumption figures and various supplementary items were laid before the R. G. A. Committee.

In order to visualize the actual manufacturing conditions, an observation trip was made by the visitors to the chief centers of the American rubber industry, the inspection including the cities of Trenton, Akron, Detroit, and Buffalo. The party, accompanied by A. L. Viles, secretary and general manager of the Rubber Association, returned to New York on January 31, and on February 3 a conference was held in Washington with Secretary Hoover, followed by an inspection, on February 5, of plants in the Boston and New Haven districts. A final conference with the American special committee was held in New York on February 8, the party sailing for home on the Olympic on February 10.

In stating the facts regarding American rubber consumption to the British representatives of the industry the American special committee laid particular emphasis on the truth of the growth of the industry in this country, affirming as its opinion that the restriction plan now operating lacks the flexibility necessary to meet our present and future requirements, while it also makes possible speculative price movements resulting in serious consequences. Plantation production, under the Stevenson plan, it was feared, might decrease, while indications are that at the present time the utmost expansion is needed.

Our special committee also urged that immediate consideration be given by the Colonial Government's Advisory Committee to some plan for releasing rubber without regard to quarterly periods or prices in order to prevent wild fluctuations as part of a speculative movement. Also, it was recommended that the Stevenson plan be abolished in its entirety, the natural conditions of supply and demand now existing being considered sufficient to fully protect the plantation industry.

Endorsement was also given to the plan formulated by Secretary Hoover for a survey of other sources of rubber supply, and a willingness to aid in the work, provided that a special appropriation could be secured, was also expressed.

In answer to these various recommendations the visiting committee agreed to present to the Rubber Growers' Association of London the facts and figures as set before them, including the statements and requests in connection with the Stevenson restriction plan. The English association had, however, expressly stipulated that their committee could not discuss the underlying principles of the legislation as enacted by the Colonial Government, nor could they express the opinions or views of the Rubber Growers' Association until they had made a report on conditions as they had found them in the United States.

Awaiting the arrival of this report, and in order to be of any possible service, the American special committee will continue in touch with the Rubber Growers' Association and the Department of Commerce.

Division and Committee Meetings

On February 9, a committee of the Automobile Fabric Manufacturers' Division met at the association office and prepared a plan under which members of the division may exchange credit information. The committee's report received consideration at the division meeting in Boston on February 19, but no definite conclusion was reached.

The Foreign Trade Division held its regular monthly meeting on February 15 and considered a number of important subjects, chief among which were the exclusion of American tires from preferential tariff treatment by Spain; the desirability of establishing the Standard Tire Warranty in Cuba and New Zealand; and the necessity for reprinting some editions of the pamphlet issued by the association in its attempt to promote the use of straightside tires in foreign countries.

The Traffic Executive Committee met on February 20, while the committee as a whole held its meeting on February 21. A number of important matters relating to traffic and transportation were discussed.

The Advertising Committee of the Tire Executive Committee met on February 20 and prepared a comprehensive, definite report concerning the contemplated national advertising campaign to educate tire users, dealers and tire manufacturers' sales forces concerning the interpretation of the manufacturers' Standard Tire Warranty. The report will receive consideration at the meeting of the Tire Executive Committee on February 27.

The Specification Committee of the Mechanical Goods Division, held its regular monthly meeting on February 21.

The Executive Committee of the Tire Manufacturers' Division met on February 27, when a number of important subjects were considered. These include certain suggested additions to the present list of standard tire sizes, and the contemplated work of making available improved accounting and merchandising methods for retail tire dealers.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires, Etc.

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
January, 1922	66	4,174,216	2,055,134	1,596,806	66	5,246,647	2,343,393	1,889,724	11	181,769	40,224	33,294
February, 1922	66	4,691,329	2,084,308	1,562,365	65	6,141,956	2,596,774	1,702,583	11	183,448	39,492	36,805
March, 1922	63	5,183,286	2,645,790	2,073,963	63	6,991,118	3,017,511	2,090,737	11	182,197	49,433	48,350
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.
"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.
"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse branch, or on a consignment basis, or abroad.

Compiled by The Rubber Association of America, Inc.

Association Notes

As a result of the unusual activity occasioned by the visit of the delegation from the Rubber Growers' Association of London in connection with the matter of restriction of crude rubber production, it was found necessary to postpone the regular February meeting of the Board of Directors until March 8.

The association office has distributed to members of the Mechanical Rubber Goods Manufacturers' Division, loose-leaf binders containing effective recommendations which have been approved by that division.

The response to the association's questionnaire covering the second six months of 1922 has been very satisfactory. It is expected that the statistics compiled from the questionnaire, which will be indicative of the condition of the rubber industry during the second half of 1922, will be ready for distribution at an early date.

The association management is at present working on copy for its Twenty-Third Year Book, which it is expected will be issued shortly.

Interesting Letters From Our Readers

Can Ficus Be Grown Commercially?

TO THE EDITOR:

DEAR SIR: I enclose a letter from the U. S. Department of Agriculture. Have heard of a hardy or semi-hardy variety of *Ficus elastica* that can be grown for commercial purposes. Any information will be greatly appreciated.

JOHN NYFLOT.

5244 W. Florissant avenue,
St. Louis, Mo.

U. S. Department Refers to "World"

MR. JOHN NYFLOT,
5244 W. Florissant avenue,
St. Louis, Mo.

DEAR SIR: Receipt is acknowledged of your letter of December 6, requesting information regarding the discovery of a hardy species of the Ficus rubber plant.

Though we have no information available regarding this plant, we would suggest that you get in touch with THE INDIA RUBBER WORLD, 25 West 45th street, New York, N. Y., where information along the line of your inquiry might be obtained.

C. B. DOYLE.

U. S. Department of Agriculture,
Bureau of Plant Industry,
Washington, D. C.

Reply of the Editor

Ficus elastica is not at the present time grown for commercial purposes. *Hevea brasiliensis* was so far superior that Ficus cultivation was discontinued. You would, however, undoubtedly get seed or cuttings from the Botanical Gardens at Georgetown, British Guiana, at Trinidad, British West Indies, or at Singapore Botanical Gardens, Singapore, Federated Malay States.—THE EDITOR.

MORSE CHAIN FACTORY AT DETROIT

The Morse Chain Co., Ithaca, New York, has completed its new factory building at Detroit, Michigan, where sprockets and adjustments used in Morse front end drives will be made. The new plant, which provides a total manufacturing area of 60,000 square feet, consists of a single one-story building of reenforced concrete construction, with quarters also for sales and engineering offices. According to Frank L. Morse, president of the company, the erection of the Detroit factory will not materially affect the local plant in Ithaca.

The Obituary Record

Son of Charles Goodyear

Professor William Henry Goodyear, son of Charles Goodyear, inventor of rubber vulcanization, died February 19 of bronchial pneumonia at his home in Brooklyn, after a brief illness. Devoting his life to the study of art, Professor Goodyear has not only written a number of authoritative volumes, but also as curator successively of both the Metropolitan Museum of Art, New York City, and of the Department of Fine Arts, at the Brooklyn Institute of Arts and Sciences, was recognized as one of America's foremost authorities on matters relating to archaeology and architecture.

He died in his seventy-eighth year, and is survived by four daughters and six grandchildren. His only son died last August.

President of Paramount Rubber Consolidated, Inc.

Officials of Paramount Rubber Consolidated, Inc., Little Falls, New Jersey, report, with deep regret, the death of Lee H. Heist, the president of their company.

Head of an Akron Rubber Business

Thomas M. Gregory, founder and president of the Gregory Rubber Co., Akron, Ohio, producers of rubber dipped goods and specialties, died suddenly shortly after arriving at the offices of the company one morning early in February. He was sixty years of age, and until his death had remained active head of the business. Thomas Gregory, Jr., his son, has been secretary of the company for several years.

New Incorporations

Adam & George Co., January 8 (Massachusetts), $52,000. J. M. Adam, president and treasurer; P. J. George, vice-president. Principal office, Worcester, Massachusetts. To manufacture and deal in hose supporters, garters, rubber goods, clothing and wearing apparel.

American Cable Co., Inc., January 12 (Delaware), $3,000,000. C. H. Mathews, Cleveland, Ohio; G. C. Moon, Cranford, New Jersey; C. E. Hodgson, Belleville, New Jersey. Delaware agent, Corporation Trust Company of America, DuPont Building, Wilmington, Delaware. To manufacture cables, rope, cord and braids and all products thereof.

Beaney Flap Sales Corporation, February 3 (New York), $30,000. J. Devitt, 541 82nd street; H. Fixler, 1539 Fulton street, both of Brooklyn, New York; W. Abercrombie, 233 West 54th street, New York City. To manufacture auto tire flaps.

Bocor Trading Corporation, January 16 (New York), $10,000. M. Pancorbo, 27 Pearl street; A. Palacios, 126 West 73rd street; C. C. Beekman, 256 Broadway, all of New York City. To deal in tires and rubber goods.

Detroit Corporation, January 25 (Delaware), $2,250,000. H. N. Carragher; N. Waterman, both of Fall River, Massachusetts; E. E. Ranson, Chicago, Illinois. Delaware agent, Corporation Service Company, Equitable Building, Wilmington, Delaware. To manufacture, buy, and sell rims of wheels, especially of automobiles.

Dunkirk Rubber Corporation, January 29 (New York), $100,000. M. Weinstein, 234 Oxford avenue; C. S. Conner, 205 East Utica street; F. Peli, Hotel Broezel, all of Buffalo, New York. Principal office, Dunkirk, New York. To manufacture rubber products.

Nassau Rubber Co., Inc., January 17 (New York), $1,000. W. F. Timme, 593 Riverside Drive; J. W. Aymar, Jr., and W. J. Tompkins, both of 350 Madison avenue, all of New York City. To manufacture rubber goods.

Neutown Tire & Rubber Corporation, January 25 (Delaware), $1,500,000. M. M. Lucey; M. B. Reese; L. S. Dorsey, all of Wilmington, Delaware. Delaware agent, Colonial Charter Company, 927 Market street, Wilmington, Delaware. To deal in rubber tires, tubes, shoes, etc.

Ott Rubber Co., January 9 (Iowa), $300,000. J. J. Ott, president; A. F. Heeb, vice-president; F. E. Ott, secretary and treasurer. Principal office, Dubuque, Iowa. To manufacture inner tubes of all kinds and sizes for automotive vehicles.

Reading Rubber Co., January 19 (New Jersey), $250,000. S. H. Bell, 605 Carsonia avenue, Reading, Pennsylvania; J. P. Stiles, 205 South 13th street, Allentown, Pennsylvania; F. C. Myers, 391 St. Joes avenue, Trenton, New Jersey. Principal office, American Mechanic Building, Trenton, New Jersey. To manufacture and sell tires, tubes and all kinds of rubber goods.

Ritz Tire Co., Inc., February 14 (New York), $10,000. D. Fried; F. N. Saffian, both of 146 Hillside avenue, Jamaica, New York; I. S. Ottenberg, 206 Broadway, New York City. To deal in tires.

Syra-Cord Tire & Rubber Corporation, January 10 (New York), $500. D. S. Blanden; E. C. Kaufmann; D. W. Hempstead, all of Syracuse, New York; J. B. Losey, general manager. Principal office, Syracuse, New York. To manufacture tires and tubes.

News of the American Rubber Trade

Financial

Goodyear Annual Statement

SETTLEMENT of The Goodyear Tire & Rubber Co., Akron, Ohio, refinancing suits out of court leaves the entire reorganization plan intact and also gives additional court approval to the various steps taken in the reorganization.

According to the report for the year 1922, the total net earnings by the organization for the period in question reached $10,983,747. After deduction of charges and addition of previously reported surplus, the total surplus, as of December 31, 1922, is estimated at $8,008,542. There is no indebtedness to banks either by the corporation or its subsidiaries, and the ratio of current assets to current liabilities is stated as being 12 to 1.

While the net sales for 1921 reached a total of $94,328,803, the figures for 1922 show an increase to $102,904,177. The value of the Goodyear property, including land, buildings, machinery and equipment is estimated at $44,728,439.

A supplementary report summarizes certain transactions consummated by the board of directors since the first of the year and is, in part, as follows:

The aggregate of bonds and debentures which the company will have retired by March 15, 1923, is $4,750,000.

The company has purchased and retired $3,195,500 par value of prior preference stock shown on balance sheet of December 31 as held in escrow and in treasury.

The company has purchased and retired $9,902,500 par value of prior preference stock out of the $29,902,500 shown on the same balance sheet as issued and outstanding, so that the total amount of such prior preference stock issued and outstanding today is $20,000,000.

The company has arranged to purchase and retire on February 1, 1924, an additional $5,000,000 par value of said prior preference stock, as of which date total outstanding should be reduced to $15,000,000.

Akron Rubber Stock Quotations

Quotations of February 21 supplied by App-Hillman Co., Akron, Ohio, were as follows:

	Last Sale	Bid	Asked
American com.	10	..	10
American pfd.	50	..	50
Amazon com.	2	2	4
Firestone com.	90	87	90
Firestone 6% pfd.	98	97½	100
Firestone 7% pfd.	96	96	98
General com.	..	100	..
General 7% pfd.	100	100	100½
Goodrich 6s	101⅜	101	101½
Goodyear com.	14¼	14	14½
Goodyear 7% pfd.	47	46½	47½
Goodyear 1st mtg.	116½	116	117
Goodyear deb.	104½	104	105
India com.	86	90	100
India 7% pfd.	85	86	95
Mason com.	6	5	6
Mason 7% pfd.	40	40	43
Marathon	2½	2	2½
Miller com.	91½	90	92
Miller 8% pfd.	104	104	104½
Mohawk com.	15	14	18
Mohawk 7% pfd.	69	66	70
Rubber Products	20	18	25
Seiberling com.	9	9	9½
Seiberling 8% pfd.	60	63	70
Star com.	15	15	25
Star 8% pfd.	..	..	80

New York Stock Exchange Quotations

February 26, 1923

	High	Low	Last
Ajax com.	13⅜	13½	13⅜
Fisk com.	15¾	15¾	15¾
Goodrich com.	36½	36⅛	36½
Goodrich pfd.	89½	89½	89½
Kelly-Springfield com.	54⅛	52½	53⅜
Lee com.	29¼	29¼	29¼
United States Rubber com.	60¼	58¾	59⅝
United States Rubber pfd.	103¼	103	103

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Blackhawk Tire & Rubber Co.	Com.	8%	.....	.....
Boston Woven Hose & Rubber Co.	Com.	$1.00	Mar. 15	Mar. 1
Brunswick-Balke-Collender Co.		1¾%	Feb. 15	Feb. 5
B. F. Goodrich Co.	Pfd.	$1.75 q.	Apr. 2	Mar. 22
Hood Rubber Co.	Pfd.	$1.75 q.	Feb. 2	Jan. 20
Hood Rubber Products Co.	Pfd.	$1.75 q.	Mar. 1	Feb. 20
India Tire & Rubber Co.	Pfd.	$1.75 q.	.....	.....
India Tire & Rubber Co.	Com.	$1.00 q.	.....	.....
Lee Rubber & Tire Corp.		$0.50	Mar. 1	Feb. 15
Paramount Rubber Consolidated, Inc.	Pfd.	1¾%	Feb. 2	Jan. 15
Paramount Rubber Consolidated, Inc.	Com.	13%	Feb. 2	Jan. 15

The Rubber Trade in the East and South

Manufactured Goods

Material supply companies report increasing volume of shipments of compounding ingredients to all the large divisions of the rubber trade, practically all of which are running at full capacity.

In tires the scheduled output is advancing with the approach of spring. On all sides manufacturers are complaining of the high price of materials, which seriously increases their cost above normal and which cannot readily be passed on to the consumer at the present juncture.

In mechanical lines the demand is not evenly divided, there being more activity in the West than in the East. It is said that one well-known company has been obliged to requisition some of the capacity of several others in the endeavor to fill its orders; also, that while the railroads are buying supplies of rubber goods the proper filling of their requirements is delayed by lack of funds.

Heel production is at a high level and is attracting new producers. One of the largest leather shoe companies has recently equipped a rubber heel making department to produce ultimately 75,000 or more pairs daily.

Footwear and weatherproofed clothing are in good production in advance of seasonal requirements. Insulated wire output is also improving and companies are behind in filling orders.

New York

More than half of the leading asbestos brake lining manufacturers of this country have recently united in establishing a permanent organization, to be known as The Asbestos Brake Lining Association, and have opened offices at 17 West 42nd street, New York, N. Y. Arnold A. Mowbray has been elected commissioner, and other executives include: S. S. Simpson, president; M. F. Judd, first vice-president; Arnold W. Koehler, second vice-president.

The Tidewater Chemical Co., Inc., 440 Washington street, New York, N. Y., specialist in chemicals, colors, and fillers, announces that J. P. Fleming has recently become associated with the organization and will assume charge of the company's rubber division, as well as becoming technical director. Mr. Fleming was formerly connected with The Seamless Rubber Co., and later with The United States Rubber Co.

The Adirondack Tire & Rubber Co., Inc., 14 Keenan Building, Troy, New York, was incorporated January 17, 1923, for the purpose of selling tires, tubes and accessories in New England and in New York State through a chain store system. Executives include: Thomas J. Brown, president; George Mayo, vice-president; Fred E. Shook, secretary, and L. M. Brown, treasurer.

At the recent annual meeting of the Society of Automotive Engineers Charles B. Whittelsey was reelected treasurer, a position to which since 1918 he has been each year successively appointed. Mr. Whittelsey was in 1916 elected a life member of the society, while since that time he has served on some of the organization's most important committees. He is president and factory manager of the Hartford Rubber Works Co., a subsidiary of The United States Rubber Co., having acted in various capacities since he became connected with the organization in the year 1901.

The Dickinson Cord Tire Corporation has recently leased quarters in the Blickman Building, Mount and Manley streets, Long Island City, where Dickinson cord tire making machines and also cabling machines will be manufactured. F. S. Dickinson is president of the organization.

Officers who will serve the Spadone Machine Co., Inc., 15 Park Row, New York, N. Y., for the ensuing year include the following: Walter W. Spadone, president and treasurer; Charles C. Spadone, vice-president and secretary. L. R. Spadone, W. A. Spadone and Paul Spadone have been appointed as directors to fill the vacancies made by the retiring directors—Henry Spadone, Alfred A. Spadone and Amedee Spadone. In addition to the manufacture of the Bolton vertical bias cutter, the company is also producing, under the direction of L. R. Spadone, a new model Griffin carburetor, especially developed for Ford cars.

J. T. Johnson, who recently resigned as a director and general factory manager of the Howe Rubber Corporation, New Brunswick, New Jersey, is now factory manager for The American Tire & Rubber Co., Akron, Ohio.

Pennsylvania

Executives of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, announce the recent appointment of W. W. Reddie as assistant to the manager of the company's industrial department. Mr. Reddie has for several years been connected with the Westinghouse organization, holding in turn various positions of responsibility.

Roscoe M. Gage, who has recently become connected with the Vulcan Rubber Co., Erie, Pennsylvania, as factory manager, was formerly associated with the Seiberling Rubber Co. as production superintendent of that company's Barberton plant, and later as technical superintendent at its Newcastle plant. For several years Mr. Gage served as chief chemist of the Portage Rubber Co., Akron, Ohio.

F. O. Bushnell, formerly connected with the United States Rubber Co. as manager of mechanical sales at Baltimore, Maryland, has been recently placed in charge of the store maintained at Philadelphia, Pennsylvania, by The Gutta Percha & Rubber Manufacturing Co., 350 Madison avenue, New York, N. Y. W. A. Kerk, who has been for many years connected with the Philadelphia establishment, will be associated with Mr. Bushnell in its management.

The tenth annual banquet of the Westinghouse Veterans' Association was held recently in Pittsburgh, Pennsylvania, many members attending. As one of the chief speakers General Guy E. Tripp, chairman of the board of directors of The Westinghouse Electric & Manufacturing Co., briefly reviewed the present perplexing conditions both in this country and abroad.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, announces the appointment of E. L. Andrew as assistant to the manager of the company's publicity department. Mr. Andrew has been connected with the Westinghouse organization since 1916, serving in various capacities.

The South

The Tiregage Valve Corporation, Charleston, West Virginia, has been recently organized with a capitalization of $200,000 and will engage in the manufacture of tire valves and gages. Officers of the new concern include: Justus Collins, president; George R. Collins, vice-president; and C. S. Munro, secretary and treasurer.

A Specialist in Tire Design

Sheldon Perry Thacher, technical assistant to the president of the United States Tire Co., New York, N. Y., was born September 20, 1883, in Hartford, Connecticut, where he was educated in the public schools, followed by two years in the Sheffield Scientific School of Yale University and three years in the Massachusetts Institute of Technology.

Sheldon P. Thacher

In 1908 he went as chemist to the Peerless Rubber Manufacturing Co., and has since been successively identified with the New Jersey Car Spring & Rubber Co., Inc., as assistant superintendent and chemist; the W. C. Hendrie Rubber Co., as general superintendent; the United States Rubber Co., as tire development engineer, and is now with the United States Tire Co. as technical assistant to the president.

Mr. Thacher was one of the first to apply chemistry to the technique of rubber manufacture in the United States and is the inventor of certain patented processes for vulcanizing rubber. He installed, equipped and operated the laboratory of the Peerless Rubber Manufacturing Co., and designed and superintended the construction, equipment and operation of the tire factory of the W. C. Hendrie Rubber Co., at Torrance, California. He has participated in the development of the composition, design, construction, and manufacture of the cord type of pneumatic tire, and has written many articles on tire design, operation, etc., for scientific and trade publications. In 1922 he visited Europe to study the tire situation from a technical standpoint.

Mr. Thacher is president of the Tire and Rim Association of America, Inc., and a member of the Society of Automotive Engineers. In 1920 he served the latter organization as chairman of the Tire and Rim division of the Standards Committee.

The Rubber Trade in New Jersey

Manufactured Goods

New Jersey rubber manufacturers continue to report maximum production in all lines. What was true of mechanical rubber goods in the past four or five months is now equally true of the tire manufacturers. Every tire factory is behind on deliveries, and this is true of all lines. Manufacturers, however, have not as yet derived much benefit from advancing prices of finished products due to the fact that goods now being made up are to apply on orders and contracts booked months ago. It will probably be May 1 before the manufacturers are benefited by high prices.

Rubber Manufacturers' Association

The Rubber Manufacturers' Association of New Jersey held its regular meeting on the evening of February 13, at the Stacy-Trent Hotel. The usual representative attendance showing the interest in association affairs was recorded. Matters of importance were

discussed, particularly in regard to comparative working conditions at other rubber manufacturing centers. The meeting unanimously passed a resolution requesting Governor Silzer to reappoint Colonel Lewis T. Bryant to the office of State Commissioner of Labor. Colonel Bryant has held office for about twenty years and has brought about many improvements in factory working conditions with credit to himself and his department, with benefit to the employes and with a minimum of expense and inconvenience to the employers of the state. The association also went on record as favoring the deeper Delaware River channel, which provides for a depth of 25 feet at Trenton. A general discussion regarding crude rubber prices as well as production and selling conditions occupied a considerable portion of the time of the meeting.

Trenton

The Reading Rubber Co., which was recently incorporated with $250,000 capital, will lease a factory instead of erecting one, believing this plan to be much cheaper. The company will select a building and install modern tire and tube making machinery. The concern has a small plant at Kutztown, Pennsylvania.

A conference of district managers of the Thermoid Rubber Co. was held during the week of February 12 to 16, when a campaign for the coming season was mapped out. The company reports business as being very good, with some departments operating 24 hours daily.

The Hamilton Rubber Manufacturing Co. reports a gradual increase in business in all departments. The company has been steadily installing new equipment and is now in a position to almost double the output.

The Murray Tire & Rubber Co. is now running to capacity and has increased the belting department 50 per cent. All the departments are running full handed and the concern reports that the production of tires and tubes is oversold for the next six months.

The Ajax Rubber Co. is running to capacity and is turning out 2,500 tires and 3,000 tubes every twenty-four hours.

The Spartan Rubber Co., Yardville, is operating to capacity with three shifts and expects to continue busy throughout the spring and coming summer. The output is sold long before it leaves the stockroom.

The trial of Herbert W. Kugler, former president of the Globe Rubber Tire Co., and Henry L. McGregory, former assistant treasurer of the same company, for misappropriation of funds, was ended by Kugler being fined $1,000 and costs and McGregory $500 and costs. It was stated by counsel for the defense in asking the leniency of the court that his clients had arranged to make full or substantial restitution, besides arranging to pay the costs of the case.

The managers and foremen of the Essex Rubber Co. were banqueted the evening of February 3 at the Hotel Sterling, where an enjoyable time was spent by all.

The Thermoid Rubber Co., one of the most prosperous concerns of its kind in the east, is very busy, some of the departments being operated twenty-four hours a day.

New Jersey

The Michelin Tire Co., Milltown, finds business 100 per cent better than last year and is now operating with three shifts. The plant is also run on holidays. About 2,000 hands are employed.

Referee in Bankruptcy George R. Beach, of Jersey City, has confirmed the sale of all the property of the Smith Rubber & Tire Co., Garfield, with the exception of small items of assets, which sold for $23,000. Mr. Beach gave the creditors and stockholders several months' time to try and raise enough cash to buy the plant, and during that time the trustee carried the property at a large expense. The plant was put up for sale in January by William L. Brunyate, trustee, when the highest bid received was that for $114,500, made by a syndicate of rubber manufacturers from Paterson, Newark, and Passaic. The raw material and machinery were sold separately at good prices.

Fire destroyed the Stockton plant of the Tillinghast Rubber Manufacturing Co., on February 16, causing a loss estimated at $100,000, covered by insurance. The company, which was engaged in the manufacture of rubber balls, tubing and rubber toys, has only operated this plant since November last, when the old Stockton Rubber Co. building was taken over and remodeled. It was equipped with $30,000 worth of machinery.

The Rubber Trade in Rhode Island

Reports from the several rubber manufacturing concerns throughout Rhode Island indicate the most promising outlook for the months to come that has confronted the industry in a long time. There has been a steady and consistent increase in orders that has warranted the speeding up of the plants and the calling in of additional help, so that full-time schedules are expected to be the rule for an indefinite period.

The manufacture of new products will necessitate the building of an addition to the plant of the Tubular Woven Fabric Co., Pawtucket, plans for which have already been drawn and accepted and preparations made to begin work just as soon as weather conditions will permit. An addition to the present shipping and storage department on Main street will be approximately 90 by 50 feet and will adjoin the present storage building. It is expected that it will be ready early in the spring, and the officials of the company expect that it will greatly facilitate the handling of orders, as it will give increased room for storage and make possible the rapid delivery of products. Other additions will be one-story with basements, 45 by 60 feet and 40 by 90 feet, of brick and mill construction.

Conditions and the outlook for continuous business for some months to come are the brightest in many months with the Woonsocket Rubber Co., one of the subsidiaries of the United States Rubber Co., at both of its plants, at Woonsocket and at Millville. Following the announcement that was posted the latter part of January that these plants would be operated on a full time schedule, came calls in the daily newspapers for experienced boot makers, 20 in number, for the Millville plant, and for 50 experienced shoe makers in the Alice Mill at Woonsocket, with steady employment guaranteed.

During the past month several changes and promotions have been made in the personnel of the executives in the various departments of the National India Rubber Co. at Bristol. William Sisson has been appointed general foreman in charge of the bare wire and cabling department, and Frederick Foster foreman of the wire shipping department.

The Alling Rubber Co., 24-36 High street, Westerly, Rhode Island, has been incorporated in Rhode Island with a view to maintaining 32 stores, both wholesale and retail, carrying a line of various rubber manufactures, particularly automobile tires and sporting goods. Officers and directors of the new organization include W. T. Alling, president; S. B. Alling, vice-president; P. C. Ward, secretary and treasurer.

The Rubber Trade in Massachusetts

Manufactured Goods

Storm after storm, a severe old-fashioned New England winter with a record snow fall, is giving all branches of the rubber footwear trade a busy season. Wholesale and retail stocks have been low for many weeks and factories have been running at as near capacity as the labor situation permits. Late orders for rubber footwear are delaying active work on canvas lines for spring and summer wear.

The prospect of even greater motor vehicle output this year than last is keeping tire makers busy, and manufacturers of automobile topping are sold well in advance. The same is true of mechanical rubber goods lines, in which railroad replacements and new equipment are beginning to figure largely. More than ordinary seasonal illness has increased the usually heavy demand for druggists' sundries at this time in the winter.

Building operations have been somewhat checked by the severe weather but insulated wire production continues unabated for early spring delivery. Hard rubber sales and waterproof clothing prospects continue satisfactory. Heels and soles are in greater demand and production, the new crêpe rubber soles having very quickly reached a large sale. Reclaimers are operating at nearly full time with prices advanced about 25 per cent.

Rubber Pavements for Boston

Mayor Curley and the Boston Board of Street Commissioners are considering the feasibility of rubber pavement for laying around hospitals, schools, courts and similar places where silence is esteemed desirable. Day Baker's letter to the EDITOR OF THE INDIA RUBBER WORLD inviting pavement information from rubber manufacturers, which was written at the instance of Mayor Curley and published in our January issue, has created no little interest and discussion. Even the cartoonists are devoting thought to the matter.

The technical features incident to the specifications and laying of rubber paving blocks on Boston streets are before the city engineering department for study and experiment, and a tentative plan to use the large available local supply of scrap rubber is being considered. John H. L. Noyes, chairman of the Board of Street Commissioners, regards the proposal as revolutionary though feasible and a splendid thing if reasonable durability can be assured at moderate cost.

Mayor Curley believes that if rubber pavements are adopted in Boston the idea will spread throughout the country and even to important foreign cities, and he sees in it a wonderful plan for utilizing the tremendous quantity of worn-out automobile tires.

Everybody, however, recognizes the fact that rising crude rubber prices have hurt rubber paving prospects, and that with the consequent resumption of the demand for reclaimed rubber, tire scrap will soon cease to be a drug on the market as in recent years.

Canvas Footwear Prices Advance

Increased costs of materials, notably crude rubber and cotton fabrics, has led the United States Rubber Co. to advance its prices of Keds and other fabric rubber soled shoes, except Regent Keds, an average of 5 per cent, effective February 1, 1923. Corresponding advances in the tennis lines of other manufacturers follow as a matter of course with few exceptions.

Boston

At the annual meeting of the Franklin Rubber Co., held February 7, Asa C. Merrill was again elected president and Lorin L. Fuller, treasurer. A dividend was declared to stockholders and a bonus to employes. Business continues to improve and the company finds its position excellent.

At the recent annual meeting of the Boston Shoe Trades' Club, Major Charles T. Cahill, of the United Shoe Machinery Corporation, was reelected president; E. T. Wright, first vice-president; Edward M. Green, second vice-president; Walter G. Dennison, secretary and treasurer.

The American Tile & Rubber Co. has been incorporated with a capital of $50,000 to manufacture rubber goods. The incorporators are Samuel Broomfield, of Jamaica Plain, Hector J. Lucies, of Stoughton, and James William Long, of Warren, Rhode Island.

Frederick C. Hood, treasurer of the Hood Rubber Co., Watertown, Basil Gavin and M. G. Francesconi have been appointed as delegates of the Boston Chamber of Commerce to the second general meeting of the International Chamber of Commerce to be held in Rome, Italy, March 18 to 24 inclusive.

Production of "Clico" crêpe rubber soles, which are manufactured for The Clifford Co., Boston, by the Appleton Rubber Co., Franklin, has reached 20,000 pairs a day and the firm is finding it difficult to meet the demand.

The Peters Manufacturing Co., a shoe goods house at 53 Lincoln street, is equipping the former Ross Machine Co. plant at Wollaston for the manufacture of rubberized shoe fabric and expects to be ready for operation about April 1. J. A. Gilooly, formerly with the Boston Woven Hose & Rubber Co. and the Plymouth Rubber Co., is in charge of the new plant.

William E. Hardy, formerly president of the Boston Belting Co., Roxbury, is acting in an advisory capacity for The Hodges Co., Inc., 43 High street, distributors of Goodyear mechanical rubber goods and stationers' rubber bands, and also selling the products of other reputable rubber manufacturers in non-competing lines. With Fred H. Price, Mr. Hardy disposed of all interest in the Boston Belting Co. last October, when George F. Willett resumed control of its affairs.

The sales department of the Boston Belting Co. is now located in the office of the Boston Belting Sales Co., at 222 Devonshire street, adjoining that of Willett & Co. The present officers of the Boston Belting Co. are: president, Franklin F. Frothingham; vice-president, Harry H. Whitesel; treasurer, Ormond E. Loomis; clerk, James A. Gill.

The Boston Woven Hose & Rubber Co., after a lapse of one year, due to economic conditions, has resumed its annual custom of distributing gold pieces to the "old timers" on its payroll. Its honor list consists of 263 employes as follows: 24, 30 years and over; 28, 25 years and over; 34, 20 years and over; 75, 15 years and over; 99, 10 years and over.

The affairs of the Phillips Rubber Co., 10 High street, have been placed in the hands of a voluntary trust. James S. Allen and Oliver Perry Hussey are the trustees, the latter also treasurer. The firm's mechanical rubber goods factory is located at 38-45 Main street, Cambridge.

Massachusetts

Thomas Moore, formerly representing the Standard Felt Co., in western New York, has joined the sales force of the Hood Rubber Co., Watertown.

The Pine Tree State Rubber Co., of Sabbatus, Maine, under the management of Frank W. Hodges and Theodore Cowen, formerly of Malden, Massachusetts, has started production of rubber heels which will be sold direct to the shoe manufacturer. Orders on hand are said to call for an output of 10,000 heels a day for several months.

The Converse Rubber Shoe Co., and Converse Tire Co., Malden, have consolidated their entire sales departments, including the former staff at the factory and also in the salesroom at 23 Lincoln street, Boston, in the building at 175 Purchase street, Boston, where four floors and the basement will enable stocking the firm's complete line.

The Bailey Rubber Heel Co., of Beverly, is starting a branch rubber heel factory at Binghamton, New York.

The Fells factory of the Boston Rubber Shoe Co., a subsidiary of the United States Rubber Co., which was closed some time ago, has been dismantled and the building is for sale. The firm's entire output now comes from the Malden plant.

Net sales of the Fisk Rubber Co., Chicopee Falls, for the year 1922 were approximately $45,000,000, a 16 per cent gain over 1921, despite lower tire prices. In units the gain was 62 per cent. The company's record year was 1920, when sales totaled $59,172,358. Earnings for 1922 are estimated to have been about $1,630,000,

after interest and depreciation, which will leave about $200,000 available for the common, after first and second preferred dividends.

New Head of the Tyer Rubber Co.

Myron H. Clark, who has recently been elected president and general manager of the Tyer Rubber Co., Andover, Massachusetts, was born July 25, 1881, and is a graduate of the Massachusetts Institute of Technology.

Myron H. Clark

He began his rubber career with the Boston Rubber Shoe Co., Malden, Massachusetts, a subsidiary of the United States Rubber Co., where he acquired intimate rubber footwear manufacturing experience as chemist, foreman, and superintendent.

Later he was successively superintendent of Goodyear's Metallic Rubber Shoe Co., and factory manager of Goodyear's India Rubber Glove Manufacturing Co., both in Naugatuck, Connecticut. His marked success in these capacities led to his promotion to general manager of footwear and miscellaneous factories for the United States Rubber Co., which position he resigned to head the Tyer Rubber Co.

Mr. Clark is familiar with European as well as American rubber manufacturing conditions, having studied them in England, France and Italy. He belongs to various business and social organizations, including the Rubber Association of America, American Society of Mechanical Engineers, and the Lotus and University clubs, New York, N. Y.

The Rubber Trade in Ohio

Manufactured Goods

Developments during the past month point to nothing less than boom conditions during the year. Already most predictions for the year have been exceeded by realities.

The automobile tire business in some of the factories is already at a peak never before experienced and never dreamed possible. Other plants are making every possible effort to increase production tickets but are being hampered by a shortage of help, especially female labor.

In the boot and shoe trade the selling season thus far has developed a much greater volume of business than did the first two months of 1921 and every indication points to an exceedingly good year. A shortage of light rubbers can be predicted for the spring months, while the demand for four-buckle arctics and specialities in ladies' boots has kept production at the highest possible peaks.

Sundries exceed all previous records in some lines. This increase is made necessary by the lack of stocks in the hands of the dealers at the beginning of the season.

The upward movement of mechanicals continues. Slowly but surely railroads are swinging into the market for greater supplies and this added to the already good volume of business can spell nothing but new records in these departments during the year.

Further stiffening of crude rubber prices has made for improvement in the reclaiming business, which has been aided by the increased production in hard rubber departments.

From many quarters have come suggestions that prices on all rubber goods, especially tires, may advance, in response to rising material costs, notably rubber and cotton fabrics, but as was the case last year, this movement lags and promises to lag for the next few months, unless the unexpected happens.

Firestone Activities

The Firestone Tire & Rubber Co. has reached a production of more than 30,000 tires a day, which exceeds by 2,000 the highest previous production reached by the company. A large portion of the increased output is going to the Ford Motor Co.

The Firestone Tire & Rubber Co. will continue to make Oldfield tires despite the retirement of Barney Oldfield as president of the Oldfield Tire & Rubber Co. The Oldfield Tire & Rubber Co. was organized three years ago in Cleveland with the Firestone organization making its product. The sales organization later moved to Akron. E. W. BeSaw, formerly manager of the Oldfield company, has been made general manager of the Canadian Firestone plant at Hamilton, Ontario. Mr. Oldfield has joined a new company connected with the automotive industry at Los Angeles, California.

Miller Increases Production

The Miller Rubber Co. has completed plans to increase production to 8,500 tires a day by March 1, which is at least 1,000 tires more than any previous daily production. The new production is almost exclusively for increased replacement business.

As a result of net earnings for the first half of the year in excess of $1,200,000, preferred dividend payments of 1 per cent were resumed September 15. Sales for the first half of 1922 totaled more than $12,000,000 as compared with $9,000,000 for the same period of the previous year. Sales for the entire year are expected to be well over $22,000,000 as compared with $18,000,000 for 1921, which showed an operating deficit of $91,000.

H. R. Baker, head of the Miller publicity department, succeeds W. S. Campbell, former advertising manager of the Miller Rubber Co., who has joined a St. Louis window display advertising company.

Goodrich 1922 Sales

The B. F. Goodrich Co. during 1922 sold a total of $93,000,000 worth of rubber products on which a net profit of $3,000,000 was made. Goodrich sales for past years were: $86,687,000 in 1921; $150,007,000 in 1920; $141,343,000 in 1919; $123,470,000 in 1918, and $87,155,000 in 1917.

Unit production for 1922 was close to former peaks if not in excess of some former levels. The company enjoyed good business in its other lines particularly mechanical goods and footwear.

The company is now working upon plans to equalize production throughout the year. Because of the seasonal character of the tire industry the output has constantly fluctuated and efforts are being made to calculate average tire production needs and maintain this average.

Motor Car Registration and Tire Demand

That annual tire requirements will be closer to 60,000,000 than was generally predicted at the beginning of the year seems possible from new world registration figures published during February by the Department of Commerce. These figures show a present world registration of passenger cars and motor trucks of 14,622,161, an increase of 2,034,717 over the previous year. American registration increased 1,851,716, while the remainder of the world showed an increase of 183,001. American registration on this basis is 12,587,444.

The increase for the year in the United States registration, according to Goodrich figures, is 16.7 per cent. The country now has one automobile for every 8.6 persons, as compared with one vehicle for every 10 persons a year ago.

The waning importance of American tire export business is made apparent by the fact that America now has more motor vehicles than the entire world had in 1921, and the consumption of tires in America has already outstripped world demand. Many

companies now view foreign business in much the same light they did during the peak period, namely as an interesting "side line."

Original Tire Equipment Policies

Kelly-Springfield Tire Co. has adopted the new policy of selling original equipment to automobile manufacturers at prices similar to those to dealers. The fact that for several years tires have been sold at cost to automobile manufacturing companies has been the subject of much discussion.

That the sale of tires for better prices to car makers is one of the goals of the rubber industry is indicated by the fact that no further expansion to take care of this type of business need be expected in the future, the inference being that as replacement business grows the large companies will gradually alter their policies and prices until the original equipment business shows a profit. More than 12,000,000 tires will be required for original equipment during the present year, according to the best information available.

Another Tire Price Advance Likely

It does not seem unlikely that automobile and truck tire prices will be increased again in the not distant future, owing to advancing material costs. It is generally believed that the new adjustment, when made, will be in the neighborhood of 12 to 15 per cent.

The advance of 7 to 15 per cent in December was to a large extent absorbed in increased profit margins given the tire dealers throughout the country. The dealers had stood for constantly decreasing profit margins from the beginning of the depression and they felt, and the manufacturers seemed to agree, that much of the increase should be allotted to them. For that reason manufacturers did not derive the benefit from the advance which the situation warranted.

Tire prices at the present time are approximately 60 per cent above 1914 levels, which is much lower than many other manufactured products. Wages are still 212 per cent above 1914 levels, while fabric is 180 per cent above the pre-war levels. These figures, it is held, justify another upward movement.

General's New Plant

The General Tire & Rubber Co. announces that its new plant and equipment will be ready for production within another month at least, giving the company a production capacity of approximately 4,000 tires a day. This will be required as soon as it is ready. It is said that the company has lost more than $2,000,000 worth of business during the past two months because of inability to fill orders. Spring dating business exceeds any booked in the history of the company.

R. G. A. Committee in Akron

Representatives of the Rubber Growers' Association of London, England, visited Akron early in February in connection with the operation of the Stevenson Plan through which the production of crude rubber has been curtailed and the price considerably increased. The accompanying photograph shows the committee at the Goodyear Tire & Rubber Co., with some of the Goodyear officials.

Rubber Growers' Committee in Akron, Ohio

Top row, from left to right: P. W. Litchfield, factory manager; C. C. Slusser, manager of the Goodyear Los Angeles plant, and L. G. Odell, head of the crude rubber purchasing department.

Second row: Sir Stanley Bois, H. Eric Miller, and P. J. Burgess, of the British commission, and A. L. Viles, secretary of the Rubber Association of America. Bottom row: Lady Bois and Mrs. P. W. Litchfield.

Williams Foundry Elects Officers

The following executives of The Williams Foundry & Machine Co., Akron, Ohio, were recently elected: F. E. Holcomb, president and general manager; S. F. Zilliox, vice-president; E. C. Jackson, secretary; G. C. Dietz, treasurer; W. D. Zehm, assistant treasurer. Other officers also recently appointed include: Wilford Holcomb, general sales manager, and W. C. Garrigues, assistant sales manager. F. H. Vermillion, formerly of the Miller repair school, becomes special sales representative for the sale of tire repair equipment.

Ohio

The Lambert Tire & Rubber Co., of Barberton, will increase production 50 per cent in the very near future following completion of a new factory unit. This is the second 50 per cent increase in capacity and production made by the company within the past twelve months. Guy M. Collette, general manager, reports that cushion tire sales for 1921 amounted to approximately $600,000, which is an increase of 85 per cent over 1921. January sales show an increase of 300 per cent over same month last year.

The Mason Tire & Rubber Co., of Kent, now ranks fifth in the Akron district, with a capacity of more than 6,000 tires a day. Purchase of the Owen Tire & Rubber Co. during the past year

doubled the company's previous capacity. During the past year the company sold in the neighborhood of $10,500,000 worth of tires and showed a net profit of $1,200,000. Its cotton mills, of which the company operates three, have shown good profits.

Reports from The Columbus Tire & Rubber Co., Columbus, Ohio, state that sales for 1922 are 205 per cent over those for 1921. Also during the first two months of 1923 sales show a gain of 100 per cent over the same months of 1922. The company plans to increase production in the near future, and is at present installing new machinery and equipment. Officers chosen at the recent annual meeting include the following: John W. Zuber, president and general manager; R. M. Fountain, vice-president; M. J. Miscoe, secretary and factory manager; and E. L. Savage, treasurer. The board of directors is composed of the above executives and Veit Koerner, A. S. Stemler, and J. F. Brennan.

The New London Manufacturing Co., New London, makers of rubberized raincoats, aprons, gabardines and whipcords, will move the plant to Marion, Ohio. R. R. Sanford, president of the company, has been in the waterproof clothing business for 24 years.

The Newton Falls Rubber Co., 2434 Euclid avenue, Cleveland, Ohio, has purchased the plant of The Trumbull Tire & Rubber Co., at Newton Falls, Ohio. Although the factory has never been in operation it has a daily capacity of 2,500 tires, and the Newton organization plans to begin with a full schedule, manufacturing Jordan tires. Irvin Jordan, formerly general manager of The Liberty Tire Co., Carey, Ohio, is to be vice-president and general manager. The company is capitalized at $500,000.

Gross sales of pneumatic tires and mechanical rubber goods as reported by the Republic Rubber Corporation, Youngstown, Ohio, show a steady increase, those for December, 1922, and January, 1923, respectively, being 110 and 132 per cent larger than sales for the month of December, 1921. Shipments in January of this year show a decided advance over those of the month previous.

Harry F. Derda, recently appointed a member of the Cleveland sales force of The Wishnick-Tumpeer Chemical Co., 365 East Illinois street, Chicago, Illinois, will call on the trade in southern Ohio.

A convention held by The American Zinc Sales Co. at Columbus, Ohio, from February 1 to 3, brought together not only the chief officials of the organization, but also members of the technical and sales forces, who met to discuss plans for the company's sales and advertising campaigns. L. E. Wemple, manager of The American Zinc Sales Co., acted as chairman throughout the session, which represented the concluding event of the most successful business year yet enjoyed by the organization.

Construction has begun on two buildings for The Faultless Rubber Co., manufacturer of rubber sundries and specialties at Ashland, Ohio. The additions include a two-story crude rubber storage and mill building, measuring approximately 45 by 136 feet, and a one-story acid storage building, to be approximately 15 by 103 feet. Changes not yet decided upon are also contemplated for the power plant and some of the equipment.

H. D. Garber, a rubber man of fifteen years' experience, is in charge of production for the Lima Cord Sole & Heel Co., at Lima. The firm's business has been reported excellent during recent months, and the plant is at present operating both day and night.

Hydraulic Press Co. Prospering

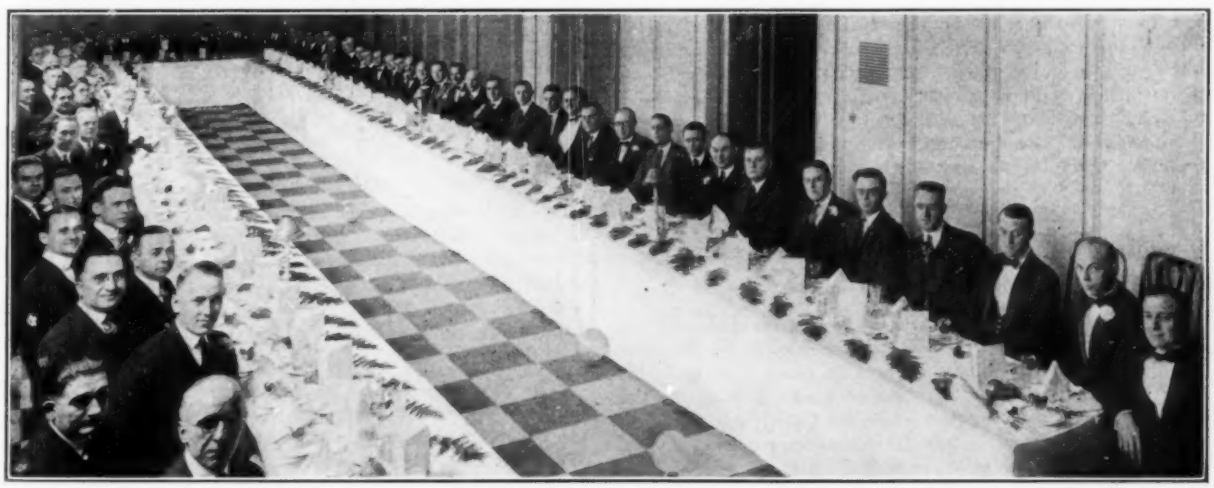
In consequence of a steady increase of business during recent years, the Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, is now contemplating an enlargement of its plant as well as the addition of some new machinery and equipment. The capitalization of the company has also been increased from $260,000 to $1,200,000.

Established in 1887, this organization has specialized not only in the manufacture of hydraulic presses, pumps and valves for all high pressure purposes, but has also devoted attention to the designing of such equipment. Due to a favorable location and excellent railway facilities, the company has been in a position to gradually extend its operations. The outlook for its future is most encouraging.

Rubber Trade in the Midwest

Midwest Rubber Manufacturers' Association

There was a good attendance at the fourth annual meeting of The Midwest Rubber Manufacturers' Association, held at the Hotel Morrison, Chicago, Illinois. About seventy-five members and guests were present in the evening at the association banquet. Following the mid-day luncheon the officers and directors for the year 1923 were elected, these including the reelection of W. W. Wuchter, as president, and Thomas Follen, vice-president. C. S. Sutherland remains secretary and general manager of the association. The treasurer will be elected at the next meeting. The four new directors chosen are as follows: W. G. Brown, Thomas Follen, Charles J. Venn and D. L. Speaker.



Fourth Annual Dinner of the Midwest Rubber Manufacturers' Association Held at Hotel Morrison, Chicago, Illinois, January 30, 1923

In his address Mr. Wuchter reviewed the unfortunate condition of the small tire makers, due to the high cost of crude rubber and other materials, and a committee was chosen to formulate a protest against the British rubber restriction act.

The next regular monthly meeting will be held on the second Tuesday in March at Cleveland, Ohio.

The change of the address of the association to 64 West Randolph street, Chicago, Illinois, should be noted.

Chicago

After a year of construction work and an investment of over three-quarters of a million dollars, production is now under way at the plant of The Krippendorf-Tuttle White Cliffs Products Co., White Cliffs, Arkansas. The property consists of a large factory equipped with modern machinery for the production of all grades and meshes of whiting suitable for the rubber trade. Calvin Stitt is manager of the company's whiting sales, and maintains offices at 30 North Michigan Boulevard, Chicago, Illinois.

The Midwest

A steadily increasing business is reported by The Standard Four Tire Co., Keokuk, Iowa, production for 1922 having been 52 per cent greater than that of the year preceding, with sales advancing proportionately. During the past two and a half years the company has been carrying on operations day and night continuously. The daily production of 1,000 tires is soon to be raised to 1,500 with corresponding tube capacity. In addition to tires and tubes, molded goods are also produced. A. E. Verner is general sales manager.

The Ott Rubber Co., Dubuque, Iowa, recently incorporated with a capital of $300,000, will specialize in the manufacture of inner tubes of all kinds and sizes. A new plant is soon to be constructed at Dubuque with a daily capacity of 2,000 tubes. The officers are: Joseph J. Ott, president and general manager; A. F. Heeb, vice-president; and Frank E. Ott, secretary and treasurer.

Press reports state that a committee representing local automobile manufacturing companies has been appointed by the Detroit (Michigan) Board of Commerce to urge Congress to provide the requested appropriation for an investigation of new sources for American grown rubber.

The Majestic Tire & Rubber Co., Indianapolis, Indiana, has been reorganized since the appointment of a receiver last August and will now carry on business under the name of The Majestic Rubber Co. For the present the organization will specialize on the production of Ford size fabric and cord tires and all sizes of tubes. Executives of the new company include: Howard M. Bradford, president and general manager; Forrest Van Pelt, vice-president; Clark Haines, secretary and treasurer.

The Rubber Trade on the Pacific Coast

Manufactured Goods

The increase in tire prices has not so far had the expected effect of slowing up sales; in fact, February tire sales at the chief distributing points on the Coast were much ahead of those in the same month a year ago. The building trades, next to the tire dealers, made the heaviest demand on the Coast rubber factories during the past month, nearly every concern reporting a good increase in orders for tiling, mats, molded goods, garden hose, and plumbers' specialties. The oil and mining companies show no let-up in their activities, as evidenced by the strong demand for transmission and conveyor belting, heavy hose, pump valves, and various packings. Druggists' sundries are in steady demand, and some good-sized orders for bathing goods are being placed by the larger chain drug stores. Retail sales of rubber footwear are reported good and stocks much depleted.

San Francisco

The Power Rubber Co., of which Postmaster James E. Power, of San Francisco, is president, and which has branches in Oakland, Fresno, and San Jose, selling tires and other rubber goods, has established a new branch in Los Angeles under the management of T. J. Turnerat, 135 E. Ninth street.

Owing to press of other business, the annual election of officers of the San Francisco Rubber Club has been temporarily postponed. The club plans many important activities for 1923 and may announce them at the first regular meeting in March, according to Secretary C. W. Jackson.

William H. Koons, connected with the advertising department of the Thermoid Rubber Co., has been promoted to a more responsible position in the company's branch at San Francisco. Mr. Koons has been with the Thermoid Company for the past nine years.

The Northwest

The Mason Tire & Rubber Co., Akron, Ohio, has opened a factory branch at 1901 Fifth avenue, Seattle, in charge of Dare E. Marriott, for a dozen years an active factor in rubber lines in Seattle. He will also have charge of the Mason warehouse on North Westlake avenue.

The Spreckels "Savage" Tire Co., San Diego, has long had its Northwest headquarters in Seattle and a depot at Portland, but recently it decided to establish the headquarters in Portland because of its better facilities for distribution. The address is 445 Stark street.

A considerable expansion in production is being planned for by the Sound Rubber Co., Tacoma. Extensions have been made to several buildings and much machinery ordered from Akron and other places. Several new agencies have recently been established in the Northwest.

Frederick S. Wilson, vice-president and Pacific Coast manager of the Thermoid Rubber Co., will resign shortly to become interested in The East-West Oil Refining Co., a California oil producing concern. C. E. Johnson, who is connected with the San Francisco branch of the Thermoid Co., will have charge of the Los Angeles territory.

Los Angeles

Production for mid-February at the plant of the Goodyear (California) Tire & Rubber Co. was 4,500 tires daily, and provision was being made as fast as possible for a daily outturn of 5,000 casings, with as many tubes. It is estimated that this production will require a working force of 2,300. The highest single daily outturn was on January 31—4,744 casings. No trouble is found in getting plenty of competent help.

The West American Rubber Co., 400-432 North Avenue 19, Los Angeles, is having a 50 by 150 extension made to its plant to house the recovering department. Additional equipment, costing $10,000, will enable the concern to practically double its output of mining, oil well, and general mechanical goods, as well as motion picture and other novelty rubber goods. Douglas L. Radford is president.

Very good business is reported by the Hendrie Rubber Tire Co., Torrance, a Los Angeles suburb. The company has recently added tubes, red and gray, to its products, and has been averaging 250 casings daily. A large increase is being made in the mechanical equipment and it is expected that the daily output will be 300 in a couple of months.

A heavy demand for cord tires and the opening of many new branch agencies in Coast cities is reported by the Samson Tire & Rubber Co., Compton, a Los Angeles suburb. Plans are being considered for further expansion of the works. Adolf Schleicher is president.

The Rubber Trade in Great Britain

By Our Regular Correspondent

Restriction Scheme Results

THE advent of the New Year has seen something of a boom in the rubber share market, which will probably lead to many of the public burning their fingers. There is little doubt that the way for a boom was well paved by the action of certain members of the Stock Exchange having purchased a large number of shares while the prices were low, trusting to the effect which forthcoming purchases by America would have on the price of the raw material. It need hardly be said that the "insiders" are not so much concerned with the intrinsic value of shares as with the idea of snatching immediate profits, and it must not therefore be assumed that such shares as have advanced most in market price are necessarily of greater value than others which have not attracted the attention of speculators and have not shown any or much market appreciation.

In connection with this upward trend of rubber shares it should not be overlooked that it has coincided with an abundance of credit in the money markets, and further, that rubber shares are by no means alone in showing appreciation. Correspondence in various papers indicates the feeling that has been aroused in the country between those whose interests are on the producing side and those on the manufacturing side, each side being disposed to charge the other with selfishness. The usual comment is the fact that the manufacturers did not at once reduce the price of goods when raw rubber fell to a low price, the writers, of course, ignoring such salient points as the cost of labor, standing charges, and the fact that many rubber goods contain more of other materials than they do of rubber.

The Proofing Industry

January is usually a quiet month for the waterproof garment industry, but there has been more activity this year. Probably this is due to a feeling that there is nothing to be gained by dealers in putting off their buying until the spring, as the prices of both rubber and fabrics are advancing and it is obvious that the price of proofing will go up. In the new models for the coming season there is nothing of startling novelty. French satins and Japanese silks are still to the fore, though not all firms care to undertake this sort of proofing. Leatherette proofing is also in demand, being put on to various qualities of fabric, from low unions to beaverteen. A new development is the acid resisting proof, quite a large demand having sprung up from chemical, bleach, gas, and other works. Leaders in this supply are Storey & Morris, of Victoria Building, Manchester, who make the acid proof clothing called "Aswapruf."

India Rubber Manufacturers' Association

The annual meeting was held on January 24, at the Midland Hotel, Manchester, F. W. Hinde, of the Avon India Rubber Co., Limited, presiding in the absence of E. Healey, who is abroad. The following constitute the new general committee:

E. Healey, W. A. Bates, Limited, chairman, Leicester; F. W. Hinde, Avon India Rubber Co., Limited, vice-chairman, Melksham Wilts; P. A. Birley, Chas. Macintosh & Co., Limited, Manchester; D. C. Campbell, Campbell Achnach & Co., Limited, Glasgow; H. C. Coles, Wm. Warne & Co., Limited, London; J. T. Goudie, Leyland & Birmingham Rubber Co., Limited, Leyland; J. Henderson, Ancoats Vale Rubber Co., Limited, Manchester; A. D. Ingram, J. A. Ingram & Son, Limited, London; L. V. Kennard, Dunlop Rubber Co., Limited, Birmingham; Alex Johnston, North British Rubber Co., Limited, Edinburgh; Sir G. C. Mandleberg, Mandleberg & Co., Limited, Manchester; R. Moseley, David Moseley & Sons, Limited, Manchester; C. R. Quartley, G. Spencer Moulton & Co., Limited, Bradford on Avon Wilts; T. C. Redfern, Redfern's Rubber Works, Limited, Hyde, Manchester; S. T. Rowe, Greengate & Irwell Rubber Co., Limited, Manchester; S. A. Russell, I. R. & G. P. & Telegraph Works Co., Limited, London; A. Ryan, Ioco Rubber Waterproof Co., Limited, Glasgow; J. Tinto, Greengate & Irwell Rubber Co., Limited, Manchester; F. Webster, Avon India Rubber Co., Limited, Melksham Wilts; A. Whiteway, Chas. Macintosh & Co., Limited, Manchester.

The annual report, a somewhat bulky document, deals with the varied activities of the association in the past year, particularly with regard to the Workmen's Compensation Act, the United States tariff, contract clauses with regard to mechanical rubber goods, accidents on mixing rolls, wage matters, and the restriction of exports of plantation rubber. An exceptionally large amount of work was done by the joint sub-committee of this association and the British Rubber Tyres Manufacturers' Association with respect to railway questions, the sub-committee having been successful in securing very considerable reductions in the rates mentioned in the provisional classification of the railway companies. The question of the organization of a composite exhibit by the association at the British Empire Exhibition is under consideration.

The projected activities of the current year include: (1) Formulation of schemes to safeguard the interests of members in their relationship with customers; (2) Evolution of a scheme whereby expert assistance may be afforded to members in connection with overseas trade, taxation question, contract conditions, transport, etc.; (3) General organization of the association, whereby the present facilities of inter-communication between members and the association may be extended, the main desire of the committee being to collaborate with all sections of the industry in order to advance the welfare of the trade as a whole.

The meeting was followed by a luncheon to which, besides members of the trade, invitations had been issued to the Lord Mayor, the President of the Chamber of Commerce, H. D. Hynes, of the Firestone Tire & Rubber Co., Akron, and others. This entry into the limelight is a new departure in the annals of the association and it is intended to make the luncheon an annual affair. It certainly proved an enjoyable function to those present and the publicity afforded by the press reports must assuredly enhance rather than detract from the general utility of the association. There were a number of speeches which, in the words of the principal local daily, ended in a discussion on Socialism, taxation, and Free Trade, and this is a very fair summary of the orators' topics.

F. W. Hinde, who was in the chair, said that in addition to the general slackness of trade their industry had to suffer unrestricted competition from America and France, tires worth four and one-half millions sterling having been imported last year mainly from these countries. Taking into consideration the number of cars in this country and the usual renewal of tires the country used about 1,800,000 tires a year and 60 or 70 per cent of them were imported. This means that 4,000,000 or 5,000,000 pounds of cotton were also imported.

Lord Colwyn, in replying to the toast of the guests, said that the continued high taxation was a drag in the progress of trade, there being no savings wherewith to develop the great industrial concerns. Passing to another topic he said that industrial unrest was a great menace and danger. In his opinion the teaching of the Socialist party, if carried out, would eventually destroy the greatness of our great businesses. The teachings of Karl Marx had no touch with present affairs and it was much to be deprecated

that they tended to make workmen look upon their employers as the greatest enemies they had.

On coming to the question of Free Trade, Lord Colwyn jocularly remarked that he did not quite know where he was and invited assistance from his audience. He said that as an exporter of cotton goods he was a Free Trader. As a rubber buyer he wished to buy cheap, and as a rubber seller, to sell dear. He was certainly not a Free Trader when it came to the British market being swamped with American tires. The situation as far as he was concerned was perplexing, but at any rate he did not hold the view that a Free Trader stood on a higher moral plane than a Protectionist.

Sir Peter Rylande, ex-president of the Federation of British Industries, agreed with Lord Colwyn that tariffs were a matter of expediency. Much might be done to meet foreign competition by internal combination. Members of a trade should "get together and meet the foreigner at the gate." No doubt British manufacturers were weakened by the competition among themselves. Trade generally was certainly reviving and in no industry, he thought, more than the rubber industry with its manifold adaptabilities. From his detached standpoint it appeared that the preservation of the planting industry was of more importance to the manufacturers than the momentary advantage of low prices.

P. A. Birley, replying to the toast of the rubber industry, proposed by J. H. C. Brooking, said that it was a great industry in the making and would eventually catch up with those represented by Sir P. Rylande (Iron and Steel) and W. Clare Lees (Cotton). During hostilities the whole of the British tire output had been taken by the government with the result that the Americans stepped in and captured both the overseas and home markets—a conquest they would not give up without a struggle.

W. Clare Lees, replying to the toast of the visitors, prepared by J. Tinto, referred to the fact that a hundred years ago one of P. A. Birley's ancestors was his predecessor as president of the Chamber of Commerce. As he was replying for the visitors, whose political views he did not know, he was not going to deal with the subject raised by previous speakers, though he was not evading the question of Free Trade or running away. The toast of the General Committee was proposed by P. H. Lockhart and responded to by Stuart A. Russell.

Institution of Rubber Industry

At the Manchester meeting in January B. D. Porritt, head of the Rubber Research Association, read a paper on its scope and progress. J. H. Mandleberg, who presided, pointed out that there were many problems which could not be tackled in a works laboratory, either because the staffs who could devote their whole time to research lacked the necessary skill and training, or because very expensive and complicated apparatus was required. In Mr. Porritt they had a man with unrivaled expert knowledge, who had been a works chemist and manager of a manufacturing department.

Mr. Porritt in his paper said that the Research Association was the outcome of the recognition during the war of the importance of research to the material welfare of the nation, the immediate result being the formation of the Department of Scientific and Industrial Research of the Privy Council. After giving various details concerning the formation of the Rubber Research Association, already made public at the opening of the laboratories at Croydon last July, the author proceeded to emphasize the fact that cooperative research must not be regarded as a substitute for the works chemist or physicist, and so far from diminishing the number of scientific men engaged in the industry should rather exert the opposite effect by increasing their scope.

The primary requirements of the works chemist were simple, accurate, and rapid methods of testing, and the cooperative laboratory would be of use in developing and standardizing the methods. It might be suggested that trade secrets and dissimilar conditions of work in the various branches of the rubber industry precluded effective cooperation in research into factory problems. The only secret of any importance to his mind was that of successful management. At the same time it had to be recognized that individual manufacturers might have already devoted much time and money to the details of special processes and provision had been made for protecting such interests if the particular process was included in the program of the association. This program had been the subject of deep consideration and at present it was confined in the main to "basic technical problems," investigations involving the use of heavy plant and labor being left to the care of the technical man in the factory. Various directions in which the association could benefit not only its members but also the nation generally were touched upon, and the paper concluded without any reference to the specific problems which had received notice in the laboratories.

When the chairman announced that the paper was open for discussion there was no ready response. Things got more lively, however, when, in reply to query as to whether anything more was being done than the works chemists were doing, Mr. Porritt elaborated some details of their work. A number of problems amounting to about one hundred had been put forward by the works and the technical men of the association had selected a certain number to go on with. Carbon blacks were being investigated to find out the reason for the wide differences between those made from gas, acetylene, and vegetable oils. Another problem of interest in connection with certain government work was the aging of vulcanized rubber. The initial part of this work involved the preparation of about 1,200 test samples, and the work generally was beyond the power of the works chemist. In the course of further discussion a speaker said that the difficulty would be to get the supplier of a carbon black to tell them its origin. The position at present was that they got one black from America which was all right, while another from a different part of America or Canada gave quite different results.

Another query had to do with the action of vulcanization upon the fabric, and in regard to this Mr. Porritt in his reply said that as there was already a Cotton Research Association, in order to avoid duplication of work, the two associations would work together to some extent in cases where the cotton in rubber goods was concerned. With regard to a question asked about the milling of rubber and the difficulty of getting at the temperature of the rubber the lecturer said that mill control was a matter of very great importance and he agreed that there was no means of accurately judging the temperature. The problems of control would not be solved until they really knew why rubber became softer, lost its nerve, as commonly said, when it was milled.

American Bonds Sold Promptly

When the Dunlop Tire & Rubber Corporation of America bonds were opened in London for subscription by the public the response was immediate and the lists were closed in an hour or two. Although no one is supposed to have any money at the present time, whenever an investment which looks really good is on offer it is soon over-subscribed. In the above case the amount was one million First Mortgage and Collateral Trust Sinking Fund 7 per cent Convertible Gold Bonds to bearer, repayable on December 1, 1942, at 105 per cent, guaranteed as to principal, interest, premium and sinking fund by the Dunlop Rubber Co., Limited. The price of issue was 97½ per cent. It is obvious that the British public has faith in the future of the Dunlop company despite its setback in 1921.

BRITISH CRUDE RUBBER CONSUMPTION, 1922

During 1922 there was a net reduction in warehouse stocks of rubber in the United Kingdom of 1,060 tons. If this amount is added to the net imports of 11,103 tons for the year 1922, it will be seen that a total of 12,163 tons of rubber were delivered to manufacturers during the year. The comparable figures for deliveries in previous years are 25,000 tons in 1920 and 24,000 tons in 1921.

The low figure for 1922 can be accounted for by the excessively large stocks acquired by manufacturers in 1920 and 1921, estimated to be as much as 5,000 tons, which would make the year's consumption about 17,000 tons.—*Commerce Reports.*

French and German Rubber Trade

By Our Regular Correspondent

France

During the first eight months of 1922, France imported 19,909 tons of rubber instead of 11,144 tons during the corresponding period in 1921. This is an increase of about 80 per cent. England imported, 9,166 tons; Brazil, 4,090 tons; Malaya, 2,018 tons; other countries, 1,555 tons. French Congo supplied 625 tons; Indo-China, 206 tons; and the other colonies on the west coast of Africa, 113 tons.

France headed the list of exporting countries, as far as tires are concerned, during 1921. The comparative figures are: France, 40.8 per cent; United States, 24.95 per cent; England, 12.15 per cent; Italy, 6.76 per cent; Germany, 5.35 per cent; Canada, 3.37 per cent; Japan, 3.30 per cent; Australia, 2.43 per cent; Belgium, 0.88 per cent.

In 1919, the percentage for France was 30 per cent and in 1920 it was 27 per cent. For 1922 the figure will be about 40 per cent, as in 1921.

At the exhibition of Rio de Janeiro, Brazil, the *Grand prix* for class 99 was awarded to M. Cillard, owner of *Le Caoutchouc et la Gutta-Percha*, and to A. D. Luttringer, editor-in-chief of the same paper.

The Société Caoutchoutière des Etablissements Primus, rue de Cais-de-Pierlas, Nice, is a new rubber company under the management of M. Weil.

Germany

The general view of Germany's situation at the beginning of 1923 may be summed up thus: People hope rather than expect that 1923 will be an improvement on 1922. The past year was a very difficult one for business here and the indications are that the present year will be no better. The *Gummi-Zeitung* represents the opinion of many when it cites the constantly decreasing value of the mark, which seems to be leading to a point where the cultural life of a people commences to cease and economic stagnation begins, as the forerunner of an approaching crisis.

It is repeatedly pointed out that despite apparent large profits, business men and manufacturers are really slowly consuming their own capital. The unsettled political situation adds to the uncertainty of the market, particularly for the rubber industry, which is so dependent upon foreign countries for raw materials. The main difficulty in this connection is not so much the impossibility of getting raw materials or the prohibitive prices, but the risk. The restriction laws in the East and the consequent rise in rubber prices, have naturally added to the burdens of manufacturers.

Fuel, of course, is always a difficult question, and the most important firms have to buy great quantities of imported coal. Benzine and benzol are also very expensive. At present, a good deal of imported benzine is again being used instead of the substitute benzol, as the difference in price is now insignificant; a liter of benzine costs 950 to 1,000 marks, while a liter (1.056 American quarts) of benzol is quoted at 850 to 950 marks.

The question of taxation is always more or less unpleasant, and under present circumstances emphasis must be put on the "more." Until now, it was possible for the industry to stand the taxes because it could postpone payment, so that settlement was usually made with depreciated marks. However, the latest decisions in the *Reichstag* have put an end to postponement; payments must be made immediately. This new arrangement will tend to add to the economic chaos already existing, it is claimed.

Business in Various Lines

What may be called the strike of local consumers is more apparent in the tire industry than in most other lines. Usually the first orders for the new season are received about this time of the year, but so far these have been conspicuous by their absence. Nowadays few people can afford the luxury of a private automobile, as the costs of upkeep are prohibitive. Tires alone form a considerable item of expense, a set, with two spare tires, costing over a million marks! Consequently it is expected that the demand for automobile tires will decrease rather than increase. The situation in bicycle tires and tubes is somewhat better, as the high rates for train and street-car fares have increased the popularity of the bicycle and as a result have stimulated the demand for tires. Besides, the prices for cycle tires and tubes are considerable lower.

On the other hand, the export trade in tires continues comparatively good, although it depends too much on the vagaries of exchange rates. Should the mark rise, bad days are in store for Germany's export business.

As for technical goods, so long as factories remain fairly busy the trade at home and abroad is satisfactory. The surgical goods branch is also active, although there is a marked weakness in the seamless dipped goods lines owing to high prices due to increased costs of benzine and benzol.

Orders for bathing caps for the coming season are also slow. The manufacture of bathing caps received a sharp set-back during the war and it may be said that the German article has not yet quite reached the standard of the leading foreign manufacturers, although great progress has undoubtedly been made. The sheet rubber cap in a variety of models and colors is a comparatively recent innovation here, but quite a few rubber manufacturers have successfully taken up this article, and rubber bathing caps in Wagner hat shape, round plate form, jockey, close fitting, or frilled cap models, decorated with bows, pleated frills, flowers, rosettes, fringes, braided bands (made of narrow tubing), etc., carried out in various shades of red, also strawberry, orange, blue, silver-gray, green, yellow, black, and lavender, may be seen in many hat and clothing stores.

To close, we may mention that the business in balls is also hampered by high prices. At present the wholesale price of a dozen tennis balls is 25,000 to 30,000 marks! Small wonder, then, that tennis players carefully look over their old balls and make them do duty for another season before venturing on the extravagance of laying out a small fortune for a new supply.

German Notes

At a recent extraordinary meeting the Asbest-und Gummiwerke Alfred Calmon, A.-G., Hamburg, decided to increase the capital by issuing 71,250,000 marks common shares and 3,750,000 preferential shares, thus bringing the capital up to 125 million marks.

The Mitteldeutsche Gummi-warenfabrik Louis Peter, A.-G., Frankfurt-am-Main, reports a net profit of 42,106,000 marks against 10,430,000 marks the year before. A dividend of 50 per cent and jubilee bonus of 25 per cent was turned out. The year before the dividend amounted to 35 per cent.

The Offenbacher Gummiwerke Carl Stöckicht, A.-G., Offenbach-am-Main, intends to raise its capital to 46,000,000 marks by issuing 20,500,000 marks common shares and 500,000 marks preferential shares. A dividend of 35 per cent against 12 per cent will be distributed.

The Dunlop Rubber Co., Hanau, reports that while the turnover for the eleven months ended June 30 was 4½ times that of the corresponding period during the previous year, the prices obtained for the finished goods, worked out in gold currency, were lower than the purchasing value of the imported raw materials. The directors are of opinion that if this condition continues, the factories will have to be shut down for a certain length of time.

The Rubber Trade in the Far East

By Our Regular Correspondent

Malaya

At present rubber latex is claiming a good deal of attention. The uses of latex, experiments with latex in paper making, and the amounts of latex exported are eagerly followed by local rubber producers, many of whom have already conjured up for themselves an ideal state in the trade where costs of making crêpe and sheets are reduced to a minimum, and profits, owing to a lively demand for latex, are fat and certain.

The ruling regarding the restriction of latex is a cause of irritation to some who think that latex, being a new departure in the rubber industry, should not be burdened with 40 per cent restriction as this would discourage the shy pioneers in the new field. However, it was amiably suggested that since latex after all was rubber and therefore could with a little preparation be used for almost any kind of manufacture, it was better in the interests of the producers that latex should be taxed exactly as rubber is taxed. As for the pioneers, a few cents more or less on a pound of rubber would hardly deter them from using latex if they were really convinced of its value for the purposes they wished it to serve.

Smuggling and Hoarding

From various quarters it has been suggested that smuggling on a more or less extensive scale would be attempted here. Certainly the rise in the price of rubber would make it a paying proposition. However, the authorities seem prepared to take action against all such get-rich-quick schemes.

For every pessimistic planter who has visions of unscrupulous persons wrecking the restriction scheme by smuggling, at least ten are absolutely sure that rubber is doomed because of the number of greedy companies that are hoarding. Smuggling is incontrovertibly illegal; the very word brings to mind scenes of lawlessness and outrage. Hoarding, however, connotes caution, thrift, and certain less commendable qualities, but none of them in active conflict with law and order. Hoarding is therefore the more pernicious because apparently innocent. The minute it was realized that people were going in for it, so to speak, action against it was urged. Now it appears that officials are considering suggestions for checking the evil, or at least making it very unprofitable for those indulging in it.

It has been suggested that the day before restriction ends there should be a stock-taking throughout the country and an excise duty imposed on all rubber in excess of that covered by licenses or coupons.

Apropos of restriction, it is interesting to learn through the *Straits Times* that Lord Churchill approved the Stevenson plan less than a week before he fell ill, and that before he had recovered he was out of office. A narrow escape for Malaya this, for if the Churchill appendix had asserted itself one week sooner, the whole business of restriction would have had to be gone through again with his successor.

Rosy Prospects

Those of us who are too busy to indulge in complaining are joyous over the upward swing of the rubber market. When we open our papers of a morning and note that rubber has gone up again half a cent per pound, we lie back comfortably in our chair and regard our whisky and soda with a smile. The papers say business in America is improving; in fact, a boom is expected. Business here is blossoming again and will have the effect of increasing imports from home, which in turn will improve the labor situation, which in its turn will react favorably, and soon business will be flourishing all over the world again in approved pre-war style.

Considering all these favorable signs, it seems that 1923 is going to be a really prosperous year with perhaps a boom in store for the rubber planting industry, too. At least, one English paper has figured out that given the rate at which America is buying rubber and the rate at which production has been going on, minus the restricted 40 per cent, the erstwhile threatening stocks of surplus rubber will have vanished before the end of 1923 and something very like a shortage of rubber will have taken its place.

A boom is not the best thing for the rubber industry, but the prospect of one after the years of hardship barely behind us will be welcomed by the great majority of people here with something like a demonstration.

Malayan Notes

The early coolie brings back the full latex pail, it appears, to judge from the results of experiments made by C. R. Ferrers. The yields from 6 to 7 in the morning remain fairly constant, but after that they drop steadily every hour. The increase in yields obtained by early tapping was anywhere from a few per cent to fifty per cent and more, according to the trees and the hour at which tapping was carried out.

It is learned that a Chinese firm in Singapore turns out about 30,000 soles and a similar number of heels per week. They are making canvas shoes of special shape for the Japanese and Chinese markets.

Ceylon

The Times of Ceylon reprints an article from an English paper in which it is intended to estimate the probable consumption and production of rubber with a view to gaging the probability of a relaxation of the present restricted output.

The total amount of plantation rubber exported during 1920 was 317,700 tons, and it is practically on these figures that restriction is based. The exact period is November, 1919, to October, 1920.

Assuming that forced restriction takes place on all Malaya and Ceylon rubber and voluntary restriction on English estates in the Dutch East Indies, India, and Borneo, the amount restricted would be 104,700 tons, from which would have to be deducted about 29,700 tons, allowance for young areas not producing in 1920. The total amounts of plantation rubber would thus be 242,700 tons. Adding to this wild rubber, 22,300 tons, the visible supply of rubber for 1923 is 265,000 tons plus any percentage that may be released during the year.

Turning to consumption, we find the share of America, taking the figures of American imports from August, 1921, to July, 1922, comes to 261,316 tons; that is, 3,684 tons less than the total supply. The requirements of the rest of the world are put at 121,100 tons.

The United States has generally been assumed to require about two-thirds of the world's rubber; therefore, if the figure of 261,000 tons for her requirement is correct the remaining third for the rest of the world would be 130,500 tons, so that the consumption of other countries besides America is put on the low side.

It is further pointed out that in considering the requirements of the rest of the world several important countries, Australia, Russia, South and Central America, South Africa, Egypt, Turkey, Morocco, Tangier, Greece, the Balkans, China, etc., have been ignored. These countries probably get their rubber from

America, so that the figures for consumption may be taken to be fairly accurate.

This being the case, it becomes clear that if no further rubber is released in the Orient, stocks in England and afloat, estimated at 100,000 tons, will be exhausted by the end of 1923. Therefore, if at least 5 per cent of the restriction is not released every three months, the price will run away. From which it is deduced that before long prices must settle at 1*s.* 3*d.* or later on it will rise more than consumers will like.

Netherlands East Indies

A preliminary report on the various chemicals used for preserving latex includes the following:

Ammonia can best be added to the latex in a liquid form, the minimum quantity being 2 per cent. Ammonia containing carbonic acid was not found suitable. Much of the latex remained liquid, and there were also little lumps and microscopically small bits of coagulated latex.

Sodium silicofluoride was used with caustic soda in the following proportions: One part of a saturated solution of caustic soda to two parts of a saturated solution of sodium silicofluoride. One part of this solution was used for every 20 parts of latex and gave excellent results.

Twenty parts of a saturated solution of sodium fluoride to 100 parts of latex was found to be sufficient.

One part of cresol, soluble in water, was mixed with two parts of a saturated caustic soda solution. The resultant mixture was used in the proportion of five to 100 of latex. As a result it was found that a dark watery fluid had separated and the latex floating on it was thick and slimy. About half the latex remained good.

Agrisol in solution with caustic soda was a good preservative but discolored the latex.

It was found that two and a half per cent of a saturated solution of caustic soda was enough. The latex arrived in good condition. Possibly smaller quantities will be found sufficient.

For certain purposes ammonia will always be preferred, but possibly it will be found that for ordinary purposes caustic soda is more satisfactory, as it is cheaper and easier to handle. Both this chemical and ammonia have the advantage of not affecting the color of the latex.

Export Duty on Latex

In connection with a question put by the director of finances concerning the liability of latex for export duty, the board of the Netherlands Indies agricultural syndicate replied that the costs of shipping latex, freight, preservations, packing, etc., made latex as expensive as rubber. For taxing purposes it should be assumed that 300 kilos of latex equal 100 kilos of rubber, and the tax for 100 kilos of rubber would be fair for 300 kilos of latex. As the f. o. b. cost price of rubber is lower than for latex, however, the minimum dutiable market price for the latter should be taken as 0.90 gilders instead of 0.825 gilders.

Latex Statistics

The report in some Deli (Sumatra) papers, that shipments of latex began in May, 1922, is not correct. As early as September and November, 1921, small shipments of latex were made, namely, 6,741 kilos and 45,134 kilos respectively.

The shipments in 1922 were as follows: 18,550 kilos in February; 72,600 kilos in March; 65,500 kilos in May; 110,210 kilos in June; 69,364 kilos in July; 56,400 kilos in August, all to America. In September 2,162 kilos of latex were sent to Great Britain and 120,700 kilos to America; the following month 128,500 kilos were shipped to America, 1,016 kilos to Great Britain, 515 kilos to Germany, and 1,015 kilos to Singapore. The total for the eight months was 646,532 kilos. It is expected that 1923 will see a substantial increase in the exports of latex from these parts.

Local Opinions on Restrictions

The apparent success of restriction in Malaya as reflected in the rising prices is reason for some Dutchmen here to question the attitude of local planters and the government in this matter. There are many who were probably pro-restrictionist in the first place who find that their countrymen are not acting in a sportsmanlike manner and are calmly pocketing the chestnuts that the English are taking out of the fire. They urge that something be done, that Dutch planters take up voluntary restriction if the government does not decide at this late hour to follow the British lead.

It must be admitted that up to the present only a few Dutch planters have cooperated with their English colleagues in the matter of restriction. After two years of worry and loss the majority of the Dutch do not think anyone can expect them to forego the profits to be obtained by producing to capacity at present prices. They contend that their government frankly refused to enforce restriction, and consequently the British have no cause to complain as they knew exactly what they had to expect. The *Nederlandsch-Indisch Rubbertijdschrift* considers it a lucky thing that the Dutch government was somewhat quicker in publishing its decision than England, for thus all adverse criticism from the latter is negated *a priori*.

Netherlands Notes

The director of the Department of Agriculture, Industry and Commerce, Mr. Sibenga Mulder, has resigned on account of illness. According to latest advices his successor is to be Dr. A. A. Rutgers, director of the Experiment Station of the A. V. R. O. S. (East Coast of Sumatra Rubber Producers' Association), Medan.

The well-known Dutch rubber paper, the *Nederlandsch-Indisch Rubbertijdschrift*, has extended its field to include tea. The paper will now be known as the *Nederlandsch-Indisch Rubber-en Thee-Tijdschrift*. A special section will be printed in English for the benefit of the English readers, and the articles will deal mainly with tea. From time to time articles on other Java products will be included. It is also planned to illustrate at least some of the matter.

Borneo

Until the slump set in, estates in British North Borneo progressed slowly but surely. At the end of 1921 58,300 acres were under rubber, an increase of 5,000 acres over the acreage of the previous year, of which over 50 per cent was in tapping. In 1920, 4,105 tons of rubber were exported from the state, as compared with 3,125 in 1921. During the first half of 1922 1,633 tons were exported, of which 793 tons went to England, 821 tons to Singapore, and the rest to America and Japan. During 1921 all companies except one joined the Rubber Growers' Association 25-per-cent output restriction scheme, which accounts for the decreased exports in that year.

Borneo suffered from the effects of the slump; nevertheless, only one estate of any size ceased operations, and this was mainly due to badly selected land.

North Borneo companies pay higher freights and duties on all imported articles except rice; at the same time, they pay no export duty and lower wages than those operating in Malaya. Again, while Borneo was only just beginning to pay the handsome dividends which had been paid in Malaya for years when the slump began and it had to suffer, on the other hand it has this advantage—that the Chartered company has helped many Borneo company to keep on its legs, so to speak, and many of these companies are now flourishing. The rubber industry is most important for Borneo, and it is hoped the improving prices will help matters here, too.

Recent Patents Relating to Rubber

The United States

Issued* January 2, 1923

No. 1,440,487 Rubber toy. P. S. H. Newell, Leonia, N. J., assignor to The Diamond Products Corporation, New York City.

1,440,495 Collapsible core. F. A. Richards and C. M. Shogren, assignors to Gillette Rubber Co.—all of Eau Claire, Wis.

1,440,553 Puncture closing inner tube for pneumatic tires. H. C. Privett, assignor of ⅓ to H. E. Privett and ⅓ to H. F. Privett—all of Long Beach and ⅓ to C. R. Privett, Burbank, both in Calif.

1,440,565 Coasting appliance. B. L. Solbjor, Boston, Mass.

1,440,690 Waterproof cigarette and cigar case. K. McMosiman, Indianapolis, Ind.

1,440,699 Resilient tire. D. M. Rothenberger, Leesport, assignor of 1/3 to W. M. Fryermuth and 1/3 to E. P. Wanner—both of Reading, Pa.

1,440,718 Valve cap. G. R. Brown, Los Angeles, Calif.

1,440,751 Air bag. J. H. Smith, San Francisco, Calif.

1,440,860 Inner tube. H. C. Babel, Buffalo, N. Y.

1,440,966 Nursing bottle. C. Campus, Brooklyn, N. Y.

1,440,974 Tire. W. H. Dornburgh, Schenectady, N. Y.

1,441,039 Nosing for automobile running boards and the like. F. H. Stanwood, Chicago, Ill.

1,441,060 Billiard table cushion. T. R. Bullock, Providence, R. I.

1,441,134 Vehicle wheel with pneumatic tire. P. and F. Theisen, Elberfeld, Germany.

1,441,171 Portable beverage dispensing apparatus. F. E. Rice, assignor to American Tap Bush Co.—both of Detroit, Mich.

1,441,176 Self vulcanizing boot for tire casings. E. M. Sabin, Kantner, Pa.

Issued* January 9, 1923

1,441,262 Removable overtread for pneumatic tires. W. C. and J. H. Bardo, Arkansas City, Kans.

1,441,309 Demountable rim. V. Tornabene, Chicago, Ill.

1,441,384 Sanitary suction for artificial dentures. J. A. and R. S. Thomas—both of Washington, D. C.

1,441,403 Sectional resilient automobile tire and means for securing the same. L. Y. Croft, Denver, assignor of ⅛ to M. L. King, Cliff—both in Colo.

1,441,406 Infant's nursing device. W. R. Dales, Philadelphia, Pa.

1,441,453 Combined accelerator pad and heel rest. G. H. Rives, New York City.

1,441,458 Demountable tread for pneumatic tires. M. A. Shotwell, Chicago, Ill.

1,441,461 Pneumatic tube for the tires of vehicle wheels. O. Trampusch, Augsburg, Germany.

1,441,593 Windshield cleaner. H. L. Lavietes, New Haven, Conn.

1,441,602 Horseshoe. F. C. Robertson, Spokane, Washington, assignor by mesne assignments, to Rubber Metal Horse Footwear, Inc., Buffalo, N. Y.

1,441,623 Nursing bottle. M. A. Davenport, assignor of ½ to G. F. Shaner—both of Los Gatos, Calif.

1,441,654 Cushion tire. A. L. Austin, Cleveland, Ohio.

1,441,875 Device for securing hats to the head. E. M. Newlands, Freshwater Bay, Isle of Wight, England.

1,441,907 Arch and ankle support. H. A. Bernstein, New York City.

1,441,965 Tire tube. J. W. Cato, Anniston, Ala.

1,442,001 Detachable heel. J. P. Reily, assignor of ¼ to E. McBride—both of St. Louis, Mo.

1,442,007 Pneumatic tire. H. F. Sheldon, assignor of 1/3 to C. M. Burroughs—both of Boston, Mass.

Issued* January 16, 1923

1,442,218 Rubber bale. E. Hopkinson, New York City.

1,442,229 Fountain syringe bag. H. H. McGee, assignor to the Goodyear's India Rubber Glove Manufacturing Co.—both of Waterbury, Conn.

1,442,242 Motorcycle wheel structure. H. N. Atwood, Smithfield, N. C., assignor to Rubwood, Inc., Lawrence, Mass.

1,442,293 Tire casing. F. B. Pfeiffer, assignor to The Star Rubber Co., Inc.—both of Akron, Ohio.

1,442,391 Folding infant's bathtub. E. Filipache, New York City.

1,442,392 Elastic legging. J. E. Gantenbein, Kelso, Wash.

1,442,407 Protective inner liner for pneumatic tires. B. Hirsch, Leominster, Mass.

1,442,436 Pneumatic tire and sectional tubing. W. Margraf, Brooklyn, N. Y.

1,442,746 Swimming appliance. P. J. Timberlake, Jackson, Mich.

1,442,748 Hoof pad. B. M. Trauger, Scranton, Pa.

1,442,761 Rubber sponge doll. M. P. Beach, Ridgefield, Conn.

1,442,768 Quickly removable dust cap. W. C. Iftiger, Los Angeles, Calif.

Issued* January 23, 1923

1,442,905 Cushion tire. C. S. Preston, San Diego, Calif.

1,442,924 Flexible belt. C. H. Carlisle, assignor to The Goodyear Tire & Rubber Co.—both of Toronto, Ontario, Canada.

1,443,069 Resilient filler for tires. J. H. Dalbey, Elgin, Ill.

1,443,080 Tire for automobiles and other vehicles. H. Lübeck, Herserud, Sweden.

1,443,167 Metallic tread for pneumatic tires. W. C. Chapman, St. Paul, Minn.

1,443,258 Cellular tire. A. Granat, New York City.

1,443,318 Vehicle wheel. A. Freund, St. Louis, Mo.

Issued* January 30, 1923

1,443,387 Valve stem closure. C. T. Shaffer, San Francisco, Calif., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.

1,443,392 Inner tube. A. E. Storer, Newark, Ohio.

1,443,425 Bottle stopper. J. P. McLaurin, Dillon, S. C.

1,443,429 Combined valve and dust cap. H. A. Ogle, Chicago, Ill.

1,443,515 Fountain pen. A. Winter, Jersey City, N. J.

1,443,652 Pneumatic tire. W. R. Savage, Omaha, Nebr.

1,443,721 Table bolster for use in the treatment of skins and hides. C. E. Albright, Philadelphia, Pa., assignor to Revere Rubber Co., a Rhode Island corporation.

1,443,754 Inner tube. D. C. McRoberts, assignor to G. & J. Tire Co.—both of Indianapolis, Ind.

* Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

The Dominion of Canada

Granted December 12, 1922

226,909 Football. K. Buchner and F. Stocklein, co-inventors—both in Schweinfurt, Bavaria, Germany.

227,040 Demountable rim. C. N. Sowden, Toronto, Ont.

227,053 Demountable rim. J. H. Wagenhorst, Jackson, Mich., U. S. A.

227,178 Reinforced inner tube. The Liberty Tire & Rubber Co., assignee of J. A. McTaggart—both of Philadelphia, Pa., U. S. A.

Granted December 19, 1922

227,207 Inner tube for pneumatic tires. H. H. Allyn, Houston, Tex., U. S. A.

Granted December 26, 1922

227,365 Sun sheltering cover for tires. H. C. E. Anderson, North Vancouver, British Columbia.

227,374 Friction tape fabric. F. B. Carlisle, Seattle, Wash., U. S. A.

227,389 Straw hat cover. S. M. Furuya.

227,415 Outer cover for pneumatic tires. J. A. Michelin, Paris, France.

Granted January 2, 1923

227,554 Penumatic tire. F. Creassey, Nottingham, England.

227,573 Spring tire. A. L. Lasmier, Bristol, Conn., U. S. A.

227,574 Tire. F. Lablanc, Willard, Manitoba.

227,575 Body heating appliance. D. E. Lutz, Buffalo, New York, U. S. A.

227,621 Cover for pneumatic tires. The North British Rubber Co., Limited, assignee of A. Johnston—both of Edinburgh, Scotland.

227,642 Rubber tire. M. Clifford-Earp, Barnes, Surrey, England, administratrix of the estate of W. T. Clifford-Earp, deceased.

227,653 Pneumatic tire. O. H. Williams, Columbus, Ohio, U. S. A.

227,658 Air tube for pneumatic tires. The T. B. McLeroth (Tubes), Limited, assignee of T. B. McLeroth—both of London, England.

Granted January 9, 1923

227,671 Snow tire. J. M. Shannon, Bangor, and C. D. Shannon, Greenbush, co-inventors—both in Me., U. S. A.

227,690 Non-puncturable resilient tire. T. H. Channon, Fitzroy, Victoria, Australia.

227,757 Stocking. C. Massey, Montreal, Que.

227,768 Child's waist. M. J. Panabaker, Kitchener, Ont.

227,775 Resilient heel for boots and shoes. H. C. Ridout, Bournemouth, Hampshire, England.

227,801 Traction tread device for automobile wheels. J. L. Wettlaufer, Toronto, Ont.

227,824 Method of building tires. The Goodyear Tire & Rubber Co., assignee of R. S. Trogner—both of Akron, Ohio, U. S. A.

227,853 Cap for valves for pneumatic tires. The A. Schrader's Son, Inc., New York City, U. S. A., assignee of J. T. Dyer, Enfield, England.

Chemical Patents will be found on page 361, Machinery and Process Patents on pages 365-369

227,854 Tire valve. The A. Schrader's Son, Inc., New York City, assignee of H. P. Kraft, Ridgewood, N. J.—both in the U. S. A.

227,855 Dust cap. The A. Schrader's Son, Inc., New York City, assignee of H. P. Kraft, Ridgewood, N. J.—both in the U. S. A.

The United Kingdom

Published January 10, 1923

188,612 Life saving appliance. F. P. Durham & Northumberland Collieries Fire & Rescue Brigade and Mills, Coal Trade Office, Newcastle-on-Tyne, North Midland Coal Owners' Rescue Stations Co., Limited, and G. L. Brown, Rescue Station, Yorke street, Mansfield Woodhouse, Nottinghamshire.

188,617 Inner tube. W. Beaney, 144 West 54th street, New York City, U. S. A.

188,635 Solid tire. Soc. Générale des Etablissements Bergougnan, Clermont-Ferrand, Puy-de-Dôme, France. (Not yet accepted.)

188,698 Cushion tire. W. L. von Edelkrantz, la Puente de Alvarado, Mexico.

188,763 Rubber in sound transmitting and reproducing devices. L. de Forest, 1391 Sedgwick avenue, New York City, U. S. A.

188,782 Tire tube. W. P. Porter, 332 East 187th street, New York City, U. S. A.

188,844 Nipple. D. J. McOmish, 8 Smith street, Thornbury, Northcote, Victoria, Australia.

188,898 Rubber fishing bait. P. F. Wadham, Waltondale, Carisbrooke Road, Newport, Isle of Wight.

188,938 Rubber splash guard. W. B. Ferguson, 9 Cyprus Park, Belfast, Ireland.

188,955 Rubber paving block. W. A. Williams and North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

188,988 Non-slipping studs for boots and shoes. N. Tetrault, 9 Belvedere Road, Westmount, Quebec, Canada.

189,022 Self sealing tube. D. J. Chappell, 52 College Hill, Llanely, Carmarthenshire.

Published January 17, 1923

189,055 Tire valve. L. Hemmerich, Altmannhofen, Germany.

189,089 Fountain pen. L. Graffe, 15 Rue de l'Ouest, Neuilly-sur-Seine, France. (Not yet accepted.)

189,127 Rubber surgical drainage appliance. M. H. Hantchér, 12 Rue de la Sorbonne, Paris, France. (Not yet accepted.)

189,133 Rubber closure for bottles. H. Verkaufsges, 22 Hasenheide, Berlin, Germany. (Not yet accepted.)

189,177 India rubber floor coverings. Coir Tire Co., Limited, and G. D. Rose, 56a Mosley street, Manchester.

189,222 Temporary lead beads in tire making. T. Sloper, Southgate, Devizes, Wiltshire.

189,300 Solid tire band. M. Hering, Ronneburg, Altenburg, Saxony, Germany.

189,310 Detachable tread band. F. J. Cheesbrough, Lloyd's Bank Buildings, Canute Road, Southampton.

189,338 Tire boot. H. V. Morris, 244 Dalhousie street, Brantford, Ontario, Canada.

189,356 Sectional air tube. O. Yates, 426½ East Market street, Portland, Oreg., U. S. A.

189,381 Inner tube. F. Rosete, Tulancingo, Hidalgo, Mexico.

189,408 Solid tire band. M. Hering, Ronneburg, Sachsen, Altenburg, Germany.

189,420 Tire. R. Bosch Akt.-Ges., 4 Militarstrasse, Stuttgart, Germany. (Not yet accepted.)

189,428 Non-skid tire protector. G. F. Hogan, 351 East Ohio street, Chicago, Ill., U. S. A. (Not yet accepted.)

189,429 Wheel tires. International Bead Wire Corp., 165 Broadway, New York City, assignee of A. C. Pratt, Deep River, Conn.—both in the U. S. A. (Not yet accepted.)

Published January 24, 1923

189,514 Rubber cap. J. Cockerill, Victoria Terrace, Alexandra Road, Cork, Ireland.

189,522 Fountain pen. F. le Boeuf, 14 Main street, Belleville, N. J., U. S. A.

189,551 Golf ball marking. R. T. Glascodine and Wood-Milne, Limited, 2 Central Buildings, Westminster.

189,552 Pneumatic tire. T. B. McLeroth, Eastburn, The Crescent, Hadley Wood, Middlesex.

189,605 Rubber shock absorbers for aircraft. H. Bolas and G. G. Parnall, Coliseum Works, Park Row, Bristol.

189,623 Rubber solid sock. W. J. S. Goldson, la Sussex Road, Hove, Sussex, and E. J. Ades, 266 West 11th street, New York City, U. S. A.

189,638 Inflated ball tire. T. H. Channon, 274 Collins street, Melbourne, Australia.

189,726 Helical spring-steel tire with rubber blocks. A. P. Mallon, 300 Baker street, San Francisco, Calif., U. S. A.

189,759 Rubber finger protectors. F. Davatz, Chur, Switzerland. (Not yet accepted.)

189,821 Chambered pneumatic tire. T. B. McLeroth, Eastburn, The Crescent, Hadley Woods, London.

189,833 Hard rubber eye bath. Umbsen Manufacturing Corporation, and H. P. Umbsen, 155 Sanford street, Rochester, New York, U. S. A.

Published January 31, 1923

189,912 Vulcanite in football shoes. J. Leeson & Sons, Limited, and J. W. Robertson. Albion Shoe Works, Spalding street, Leicester.

189,939 Life saving suit. J. P. McGlade, Carrick street, Kells Co. Meath.

189,979 Revolving rubber heel. T. Bretherton, Woodville, Moss Lane, Leyland, Lancashire.

190,011 Armored tire. E. J. Richards, 37 Penallt Terrace, Llanelly, Carmarthenshire.

190,015 Revolving heel. S. H. Stubbs, 6 Bankfield avenue, Victoria Park, Manchester.

190,022 Eye bath. F. Maier, 231 Niles street, Elizabeth, N. J., U. S. A.

190,073 Protected tire. A. Buchanan, 20 Peverell Park Road, Plymouth.

190,076 Tire rim. G. A. Pirelli, 144 Queen Victoria street, London; Soc. Italiana Pirelli, Milan, Italy.

190,080 Rubber protectors for heels. W. D. Sternberg, 19 City Road, London.

190,087 Rubber soles and heels. H. Tattersall, Newtown, Barnoldswick, Yorkshire.

190,094 Adjustable rubber heel. F. Jamieson, Sunnyside, Holmslack Lane, Preston.

190,128 Tire rim. C. L. Baudry de Saunier, 108 Rue Lauriston, Paris, France. (Not yet accepted.)

190,162 Cushion tire. V. Marti Cabretosa, 3 Plaza de la Barceloneta, Barcelona, Spain.

190,216 Children's garment support. H. McEldowney, 518 Windsor avenue, Windsor, Ontario, Canada.

New Zealand

Published December 14, 1923

46,831 Rubber heel. G. MacPherson, Makikihi Waimate.

47,549 Inner tube. A. J. Ostberg, "Glenfern," corner of Hotham and Inkerman streets, East St. Kilda, near Melbourne, Vic.

48,699 Non-skid tire. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of P. W. Litchfield, 38 Marshall avenue—both of Akron, Ohio, U. S. A.

48,736 Rubber ball pneumatic tire. The Standard Rubber Works Proprietary, Limited, Judd street, Richmond, near Melbourne, Vic.

Germany

Design Patents Issued, with Dates of Issue

832,752 (November 11, 1922) Ladies hat of rubber or rubberized material. Erkos-Gesellschaft m. b. H., Munich.

832,756 (November 13, 1922) Sanitary band of rubber. Dr. Edith Sternberg, Schlüterstrasse 60, Charlottenburg.

832,807 (September 30, 1922) Rubber sucker with suction edge for dental purposes. Ernst Rosenbaum, Friedberg, Hessen.

832,914 (November 9, 1922) Rubber protective clothing for acid workers. Fa. Adolf Patzner, Hirschberg in Schl.

832,916 (November 9,1922) Rubber apron with decorations, bands, etc. Vereinigte Gothania-Werke, A.-G., Gotha.

833,240 (November 25, 1922). Rubber heel. Willy Zinnow, Sachsenwaldstrasse 27, Berlin-Steglitz.

833,257 (October 13, 1922). Rubber holder for cigars and cigarettes. Leo Koeppel, Meinekestrasse 24, Berlin.

833,261 (November 4, 1922). Ice bag. Radium Gummiwerke m. b. H., Köln-Dellbrück.

833,263 (November 16, 1922). Protective cover for bicycle and automobile tubes. Viktor Klausa, Rühmkorffstrasse 10, Hannover.

833,299 (November 20, 1922). Elastic brassiere. Vereinigte Gummiband-Webereien Tillmanns, Schniewind & Schmidt, Elberfeld.

833,345 (April 24, 1922). Exchangeable heel. Ernst Becker, Goch, Rheinland.

833,346 (April 24, 1922). Exchangeable heel. Ernst Becker, Goch, Rheinland.

833,449 (November 14, 1922) Rubber bib or apron. Fritz Thiele, Springerstrasse 9, Leipzig.

833,480 (November 6, 1922). Rubber operating glove. Helmuth Sartorius, Bütersworthstrasse 1, Hannover.

833,534 (October 23, 1922). Rubber heels and soles that are vulcanized after being cut. Gummiwerke Alpa G. m. b. H., St. Goar.

833,685 (October 30, 1922). Sole or heel of rubber. Adolf Löwenstein, Hamm in Westphalia.

834,176 (August 12, 1922). Heel, with exchangeable rubber tread. Theodor Grosskortenhaus, Schutzenstrasse 227, Dortmund.

834,258 (November 30, 1922). Rubber heel with leather insert. Ewald Heidemann, Grossenhain.

834,310 (November 30, 1922). Rubber sole. Viktoria Gummiwerke G. m. b. H., Berlin.

834,404 (November 25, 1922). Cylindrical surgical instrument of sponge rubber. Dr. Leo Silberstein, Rosenheimerstrasse 19, Berlin.

834,449 (November 30, 1922). Belting disk with rubber cover. Ewald Heidemann, Grossenhain.

834,469 (October 24, 1922). Pessary. Fa. C. Stiefenhofer, Munich.

834,519 (November 28, 1922). Toy of washable cloth with inlay of inflatable rubber. Margot von der Heyden, née Jentsch, Helmstädterstrasse 17. Berlin-Wilmersdorf.

834,554 (November 25, 1922). Breast pump. Sanitätshaus Arthur Wolff, Düsseldorf.

834,560 (November 20, 1922). Inhaling apparatus. Johann Biefang, Mörs.

834,647 (January 31, 1922). Rubber doll's head. Hedwig Maria Huldschinsky, nee Strasser, Knesebeckstrasse 78-79, Charlottenburg.

Germany

Patents Issued, with Dates of Issue

368,973 (September 30, 1921). Inhaler. Karel Lokvenc, Prague, represented by: Abrahamson, Berlin S. W. 47.

369,265 (May 25, 1922). Driving belt. Johannes Christian-Bischoff, Arndtplatz 1, Kiel.

369,274 (December 17, 1920). Pneumatic tire with protected cover. Frederick Lionel Rapson, Liverpool; represented by: Dr. R. Geissler, Berlin, S. W. 11.

369,860 (February 6, 1921). Stuffing box packing. Rudolf Aldag and Heinrich Borchers, Nienburg a. W.

Trade Marks

The United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

Granted January 2, 1923, Act of February 20, 1905

163,037 TENSON—automobile tires. Chicago City Rubber Works, Chicago, Ill.

163,059 VEE-ROUND—Power-transmitting belts of fabric, rubberized fabric, or leather composition. Durkee Atwood Co., Minneapolis, Minn.

163,077 DIAMOND—adhesive tire repair materials. The B. F. Goodrich Co., New York, N. Y.

163,086—SAVAGE-GRIP, the initial letters being twice the size of the others; the remaining letters being underlined—patches for fabric tires and inner tubes. Savage Grip Sales Co., Denver, Colo.

163,108 STICKS LIKA LEECH, double underline under words; to the left a fanciful picture of a girl in diamond-shaped frame—automobile tire patches. Leech Tire Patch Co., Cincinnati, Ohio.

163,126 Representation resembling cording arranged in the form of a mirror frame—jar rings, rubber belting, hose, and packing. The Mechanical Rubber Co., New York, N. Y., Chicago, Ill., and Cleveland, Ohio.

163,128 Oval dotted outline, inside heavy black oval outline; above heavy oval the words, Merritt Rubber Co., Inc.; within oval and above dotted outline the word "Guaranteed"; beneath the dotted line outline the word "Serviceable"; inside the dotted oval the words, "The Mark of the Merit Tube;" on imaginary line passing through center of design the words "Positively Porous Proof"; beneath the design the address "New York, N. Y., U. S. A."—rubber vehicle tires and inner tubes. Merritt Rubber Co., Inc., New York, N. Y.

163,143 "999"—resilient tires and inner tubes. The Oldfield Tire Co., Akron, Ohio.

163,158—REX-BLAK—vulcanizable material comprising a mixture of rubber, glue, and carbon black, sold in unvulcanized condition and used in manufacture of rubber products. Rex-Hide Rubber Manufacturing Co., East Brady, Pa.

163,159 REX-HIDE—description same as 163,158.

163,165 Elephant wearing a saddle, standing on the globe; on the face of the globe the words: "Jumbo Brand Famous the World Over" "Manufactured by The Schoellkopf Co., Dallas, Texas, U. S. A."—shoe and boot linings (cut out), shoe and boot uppers, rubber and leather heels and soles, and canvas shoes. The Schoellkopf Co., Dallas, Texas.

163,180 VACU-GRIP—subcasings of fabric, rubber, and gum for tires. A. J. Stephens Rubber Co., Kansas City, Mo.

163,181 Within a shield the word "Veribest," beneath which the letters "S P H" arranged in separate shaded blocks, the H being beneath the other two—blow-out patches, fruit jar rubbers, and garden hose. Strevell-Paterson Hardware Co., Salt Lake City, Utah.

163,194 Indian head in a circle, separating the words "Red Fox"—tubes for tires. United States Tire Co., New York, N. Y.

Granted January 2, 1923, Act of March 19, 1920, Section 1 (b)

163,243 FULL YEAR—rubber tires. New Process Co., Warren, Pa.

163,262 MUN-CEY—shoes of leather, leather and fabric, leather and rubber. Whitehouse & Hardy, Inc., New York, N. Y.

Granted January 9, 1923, Act of February 20, 1905

163,287 FLO-TO, fanciful arrangement within an oval outline—rubber dolls, toy fish, turtles, and ducks. Justus Brauer & Son Co., Philadelphia, Pa.

163,316 Conventionalized cross with the words "BUTIX" and "CUTIX" extending from arm to arm and from top to bottom respectively so that the central T is common to both words—sanitary pillows. David Feinburg Co., doing business as The Rubber Co., Chelsea, Mass.

163,320 PREMIER—rubber tires for bicycles, carriages, and automobiles. The Fisk Rubber Co., Chicopee Falls, Mass.

163,366 MANHASSET, above a silhouette of an Indian in a canoe; cotton bolls each side of picture—cotton fabrics in the piece used in making tires. Manhasset Manufacturing Co., Providence, R. I.

163,383 MAGNA—india rubber tips and pads for heels for boots and shoes. Phillips Patents, Limited, London, England.

163,387 VAGEX—syringes and nozzles. Dr. Pollack Health Products Corp., New York, N. Y.

Granted January 9, 1923, Act of March 19, 1920, Section 1 (b)

163,430 RUBBERIZED LEATHER, arranged in two lines, the initial R and final D of "Rubberized" marking the ends of the two lines—leather. Alfred I. Duprey, Eureka, Calif.

Granted January 16, 1923, Act of March 19, 1920, Section 1 (b)

163,517 REMINGTON—rubber tires. The National Tire & Rubber Co., East Palestine, O.

163,532 "THE ELASTIC THAT LASTS"—elastic webbings. The Russell Manufacturing Co., Middletown, Conn.

Granted January 23, 1923, Act of February 20, 1905

163,693 Two lines of script: above, "N & C;" below "NICHOLSON & CO."—raincoats. Nicholson's Raincoat Co., Limited, St. Albans, England.

163,730 The word "INTIRE" within a heavy black circle, the word "Swartz" in white lettering above in the black border, and "Brand" in white on the black below—rubber cement rim and gasket cement, liquid puncture repair for bicycle tires, and friction adhesive tape. Swartz Brothers, Chicago, Ill.

Granted January 30, 1923, Act of February 20, 1905

163,787 RADIO, letters graded in size, largest being in center, smallest at ends—rubber heels. B. A. Corbin & Son Co., Boston, Mass.

Granted January 30, 1923, Act of May 19, 1920, Section 1 (b)

163,823 WELLINGTON, slightly curved—inner tubes and tire casings. E. H. Sprague, doing business as Wellington Co., Omaha, Nebr.

163,866 GOODYEAR CORD—rubber and fabric tires. The Goodyear Tire & Rubber Co., Akron, Ohio.

The United Kingdom

Published January 3, 1923

429,708 CHORUB—rubber goods included in class 49. Chorley Rubber, Limited, Weldbank Works, Whittam Road, Chorley, Lancashire.

431,087 PNEUMASTAMP—india rubber hand stamps for marking paper and linen. The Pneumatic Rubber Stamp Co. (Buck's patent), Limited, 18-19 Queenhithe, Upper Thames Street, London, E. C. 4.

Published January 10, 1923

B420,191 EVERSAFE—infants' soothers. F. Schutze & Co., Limited, Black Bull Works, Caledonian Market, London, N. 7.

430,235 THE PLUMAGE BLIZZARDEEN, the word "plumage" in larger boldface capitals—waterproof coats. Gerrish, Ames & Simpkins, Limited, 63-67 Carter Lane, London, E. C. 4.

431,000 LEKTRAPREZZ—vulcanizing apparatus. Harvey Frost & Co., Limited, 148-150 Great Portland Street, London, W. 1.

Published January 17, 1923

420,227 GOODRICH—india rubber goods not included in other classes: namely, tires, inner tubes, sponge bags, bumpers and buffers, hot water bottles, crutch tips, rubber sheets, rods and tubing, heels, mats, etc. The B. F. Goodrich Co., Limited, 117 to 123 Golden Lane, London, E. C. 1.

427,040 CALRUB—rubber football bladders, William Currie & Co., Caledonian Rubber Works, Dalry Road, Edinburgh.

429,897 KANGAROO—Goods included in Class 40 but not including elastic webs or similar products.

430,835 KALATEX—All goods included in Class 39, Kaye's Rubber Latex Process, Limited, 7 and 8 Great Winchester Street, London, E. C. 2.

430,836 KALATEX—Goods included in Class 40. Kaye's Rubber Latex Process, Limited, 7 and 8 Great Winchester Street, London E. C. 2.

431,086 VELLEMETTE—waterproof clothing. The Popular Warehouses, Limited, 105, 106, 107 Wood Street, London, E. C. 2.

Published January 24, 1923

B428,275 Eagle with outstretched wings, surmounting a double-lined circle, within which the word "Trademark" following the upper curve, and on a black background in center of circle "N. B. Packing"—india rubber packing. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

430,003 KANGAROO—engine and machine packings and jointings, hose, asbestos rope, etc., all in class 50. The Beldam Packing & Rubber Co., Limited, 29 Gracechurch Street, London, E. C. 3.

430,489 VIC-MINSTA—lettering in white on black oval background; the word "Dolandus" above the oval and "Raincoats" below—raincoats. George Dolan, Limited, 143-145 Victoria Street, London, S. W. 1.

431,777 FLEXIDE—machine belting of india rubber, gutta percha or balata. Flexide, Limited, 10-12 Bread Street, London, E. C. 4.

Published January 31, 1923

422,824 RODCOL—boots, shoes and leggings of india rubber in combination with vegetable fibrous material, or with a mixture of vegetable fibrous and leather waste material, the india rubber in all cases predominating. Charles Richard Colyer, 423 Fulham road, Chelsea, London, S. W. 6.

427,946 A balanced scale and the name "A. W. Faber"—pencil and ink rubbers and erasers included in class 39. Count Alexander von Faber-Castell, trading as the firm A. W. Faber and also as the firm of J. W. Guttknecht, Haus No. 2, Stein, near Nuremberg, Germany.

429,541 YECO—goods of india rubber and gutta percha included in class 40 and not in any other class, but excluding pneumatic tires and similar goods. Eugene Ropp, 10 Rue des Villas, Besançon, Doubs, France.

429,969 On a square representing coarse fabric, the letters "V D," the V breaking through the D—waterproof and rainproof clothing. Jonas Van Dam, 94 Heerengracht, Amsterdam, Holland. For service in the United Kingdom address care of John G. Wilson & Co., 55 Market Street, Manchester.

430,250 ORATEX—waterproof and rainproof garments. M. Barr & Co., Limited, 83 Hutcheson Street, Glasgow, Scotland.

430,356 PARATEX—waterproof garments. M. Barr & Co., Limited, 83 Hutcheson Street, Glasgow, Scotland.

431,003 MOTHER'S ARM—rubber holders for baby feeding bottles. Hugh Steeper, 73 Arcadian Gardens, Bowes Park, London, N. 22.

431,545 PUNCH—footballs, Barrow, Hepburn & Gale, Limited, 47 Weston Street, London, S. E. 1.

The Dominion of Canada

Registered

32,442 PATHFINDER—rubber tires. The Goodyear Tire & Rubber Co., Limited, Toronto, Ont.

32,535 BULL DOG; words separated by representation of a bulldog—automobile tires and tubes. The T. Eaton Co., Limited, Toronto, Ont., and Winnipeg, Man.

32,546 GIANT—tires, inner tubes, casings, patches, and accessories. Ames Holden Tire Co., Limited, Montreal, Que.

32,573 GLIDER, surmounted by representation of a bird in flight, with name and address of the manufacturers beneath—bicycles, vehicles, and pneumatic tires. The T. Eaton Co., Limited, Toronto, Ont., and Winnipeg, Man.

32,586 FEDERAL—all goods made wholly or partly of rubber not philosophical or scientific instruments, telephone instruments, apparatus or appliances for surgical or curative purposes (rubber bandages), rubber flesh or friction gloves, teething pads, syringes, clothing, rubber boots, coats, caps, stationery, rubber bands, erasers, fountain pens, sporting articles such as golf balls and tennis balls, hose, packings, combs or buttons. The Federal Rubber Co., of Illinois, Chicago, Ill., and Cudahy, Wisconsin, U. S. A.

32,587 Pennant bearing the word "Federal"—description of products same as for 32,586.

32,627 Word "Ingram's" in script having a flourish beneath the word and separating it from the word "London" in sloping block type—instruments and apparatus, not medical, for surgical and curative purposes, hot water bottles, water pillows, photographic balls, tubing, spray balls, bulbs and bellows, syringes (not surgical) air cushions, hot water beds, count drop tubes, insulation gloves, stoppers and bungs, all being made of india rubber. J. G. Ingram & Son, Limited, London, Eng.

32,638 Representation of a balance, followed by the name: "A. W. FABER"—stationery, including fountain pens, rubbers, india rubber bands, etc. A. W. Faber, Stein near Nuremberg, Germany.

New Zealand

Published December 14, 1922

19,449 RESTAN—resilient heel or pad for insertion in boots and shoes. Marshall Shoe Co. Proprietary, Limited, Richmond, Victoria, Australia.

Designs

The United States

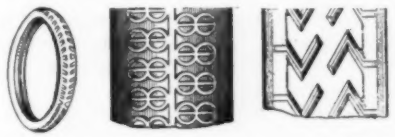
Issued* January 2, 1923

61,754 Tire. Term 14 years. Horace Hillyard Hastings, Toronto, Ontario, Canada.

Issued* January 16, 1923

61,797 Tire. Term 3½ years. Frank E. Bessler, Akron, Ohio.

61,805 Playing ball. Term 14 years. Richard T. Griffiths, assignor to The Miller Rubber Co., both of Akron, O.



61,754 61,797 61,811

61,806 Playing ball. Term 14 years. Richard T. Griffiths, assignor to The Miller Rubber Co.—both of Akron, O.

61,811 Tire Tread. Term 14 years. Charles J. Venn, Chicago, Ill., assignor to Century Rubber Works, Cicero, Ill.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

The Dominion of Canada

5,652 Tire Tread. Oak Tire & Rubber Co., Limited, Toronto, Ont.

5,658 Tire Tread. K. & S. Tire & Rubber Goods, Limited, Toronto, Ont.

5,659 Cord Tire Tread. J. O'Mara, Toronto, Ont.

5,666 Children's rubber or rubberized pants. Kelton Rubber Co., Toronto, Ont.

5,667 Children's ventilated pants. Kelton Rubber Co., Toronto, Ont.

Exports of India Rubber and Caucho from Manáos and Iquitos During the Year 1922

EXPORTERS	Europe						New York						Grand Totals
	Fine	Medium	Coarse	Caucho	Balata	Totals	Fine	Medium	Coarse	Caucho	Balata	Totals	
Ohliger & Co.....*kilos*	1,703,783	146,660	53,387	586,416	49,827	2,540,073	1,197,905	127,551	308,393	546,994	139	2,180,982	4,721,055
General Rubber Co. of Brazil	1,013,051	54,297	88,703	97,949	45,121	1,299,121	1,195,677	213,971	280,497	290,855	74,793	2,055,793	3,354,914
Vianna, Lyra & Co.....	1,012,402	78,075	202,102	412,919	1,715	1,707,213	304,111	31,508	61,134	11,336	.....	408,089	2,115,302
J. G. Araujo.....	139,455	12,435	15,131	3,680	96,612	267,313	42,782	10,103	7,917	2,281	14,924	78,007	345,320
Stowell & Co.....	104,773	16,562	5,908	.....	.....	127,243	83,200	15,840	29,348	58,054	.....	186,442	313,685
B. Levy & Co.....	.....	.....	.....	.....	158	158	48,099	6,762	38,002	36,972	281	130,116	130,274
Tancredo Porto & Co....	27,377	5,185	146	30	.....	32,738	939	514	61,606	25,822	.....	88,881	121,619
Higson, Jones & Co.....	55,054	2,854	8,837	42,568	.....	109,313	1,280	.....	.....	.....	.....	1,280	110,593
Semper & Co.....	69,621	4,281	4,039	4,265	916	83,122	.....	.....	1,680	.....	11,160	12,840	95,962
Madeira Mamoré Ry. Co.	68,078	3,060	.....	.....	.....	71,138	.....	.....	.....	.....	.....	.....	71,138
Companhia Fluvial	29,000	1,741	.....	.....	.....	30,741	9,629	.....	.....	.....	.....	9,629	40,370
Simfronio & Co.....	.....	.....	.....	.....	.....	.....	2,540	7,580	2,850	7,260	.....	20,330	20,330
J. Essabbá	15,000	.....	.....	.....	.....	15,000	.....	.....	.....	.....	.....	.....	15,000
Gomes & Co.....	170	.....	.....	.....	561	731	.....	.....	4,080	.....	.....	4,080	4,811
E. Strassberger & Co....	.....	.....	.....	.....	1,635	1,635	.....	.....	.....	.....	1,559	1,559	3,194
J. Carneiro da Motta....	56	.....	.....	.....	.....	56	.....	.....	500	.....	.....	500	556
Ferreira, Costa & Co....	29	67	48	23	43	210	.....	.....	.....	.....	.....	.....	210
Wilson, Holgate & Co. (Brazil), Limited	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	132	132	132
J. A. Leite & Co.....	100	.....	.....	.....	.....	100	.....	.....	.....	.....	.....	.....	100
In transit from Manáos..	4,237,949	325,217	378,301	1,147,850	196,588	6,285,905	2,886,162	413,929	796,007	979,574	102,988	5,178,660	11,464,565
In transit from Iquitos...	8,971	22,601	2,321	491	856,343	890,727	95,901	122,906	57,019	119,048	149,988	544,862	1,435,589
Totals .....*kilos*	4,246,920	347,818	380,622	1,148,341	1,052,931	7,176,632	2,982,063	536,835	853,026	1,098,622	252,976	5,723,522	12,900,154

Destinations

	New York	Liverpool	Hamburg	Havre	Antwerp	London	Amsterdam	Lisbon	Rotterdam	Rio de Janeiro	Leixões	Totals
From Manáos .....*kilos*	5,174,760	3,340,615	2,003,451	746,975	136,365	14,072	26,350	13,650	4,160	3,900	267	11,464,565
Iquitos	544,862	185,112	469,990	138,217	.....	97,408	.....	.....	.....	.....	.....	1,435,589
Totals .....*kilos*	5,719,622	3,525,727	2,473,441	885,192	136,365	111,480	26,350	13,650	4,160	3,900	267	12,900,154

The London View of the 1922 Crude Rubber Market

From the Annual Reports of S. Figgis & Co. and Lloyd, Matheson & Carritt, London, England

THE outstanding features of the rubber trade during the year 1922 have been the big increase in plantation output; the much larger shipments to America, the United States having taken the whole excess over 1921; and the adoption by the Malay and Ceylon Governments of the Stevenson restriction plan in an attempt to stabilize the market, notwithstanding the fact that Dutch support was withheld.

Plantation Progress and New Uses of Rubber

Noteworthy progress has been made both on the agricultural and scientific sides of the industry. New methods of planting with bud-grafted stumps and selected seeds may in time revolutionize the industry, and more scientific methods of tapping may not only assist in checking disease but may eventually increase yields and reduce costs. On many plantations improved methods of coagulation and preparation have been adopted, and in some cases even vulcanized articles made.

The Rubber Growers' Association has been successful in its active efforts to find new uses of rubber. It has been instrumental in popularizing pure crêpe rubber soles, the sale of which has largely increased, and in introducing rubber latex in paper making. The latter is still in a more or less experimental stage but is expected to prove useful and possibly to cheapen production. It has also been found that with rubber latex treatment shorter staple cotton fabric may be used in tire manufacture at greatly reduced costs. Certain difficulties in the shipment and preservation of rubber latex are rapidly being overcome.

The Market

Plantation Rubber

The low price of 11¼*d.* per pound for spot standard crêpe and sheet with which the year opened, following the abandonment of voluntary restriction, became worse in February when it touched 7¾*d.* Thus in a few weeks all the benefits derived from many months of restricted tapping were lost. London stocks steadily increased and there was little improvement in succeeding months, except that in April and June the price rose to 9*d.* on rumors of restriction, falling away again rapidly until in August the lowest price of 6¾*d.* was reached with the knowledge that no restriction cooperation from Dutch planters would be forthcoming. In October, on the news that the British Government had recommended the Stevenson scheme of restriction to the Ceylon and Malay governments, the price rose rapidly to 1*s.* 0¼*d.*, and on adoption of the plan continued to advance with moderate fluctuations, closing at 1*s.* 2¾*d.*, or more than double the lowest quotation touched during the year. The average for the year, however, was only 8¾*d.* per pound.

Pará Rubber

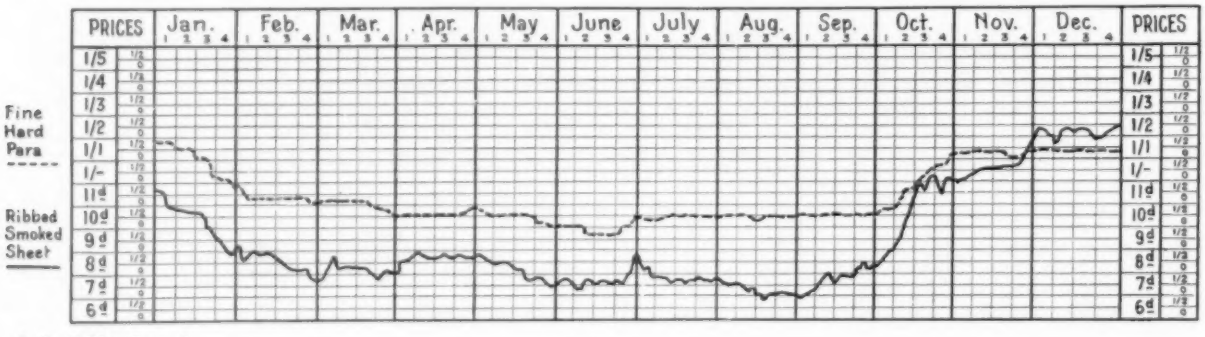
The fine Pará market generally followed the course of plantation rubber, but with very little speculation. Prices fell from 1*s.* 1¾*d.* per pound at the beginning of the year to 9¾*d.* in June, following which the market remained steady until October, when the price rose with plantations to 1*s.* 1¼*d.*, and has since kept firm. Caucho ball has been scarce and relatively high at 11*d.* per pound. Trade in other medium descriptions was dull until in the last two or three months old imports sold at slightly better prices.

Jelutong, Balata, Gutta Percha and Reclaim

Sarawak jelutong sales have been slow and limited owing to the low price of rubber. Present values are £34 per ton c. i. f., Palembang, £47 10*s.* per ton c. i. f., and compressed jelutong 8*d.* per pound.

The Venezuela balata crop was small, some fine quality block from the Amazon district sold well, even during the dull period, at a considerable premium on f. a. q. Venezuela. Small shipments generally of good quality came regularly from Panama and sold relatively well. The market for both sheet and block was very quiet during the first half of the year and spot prices fell from 3*s.* 6*d.* to 2*s.* 11*d.* per pound for sheet, and from 2*s.* 9*d.* to 2*s.* for Venezuela block. In July more demand developed, prices advanced to 3*s.* 4*d.* for sheet and 2*s.* 6½*d.* for block, continued firm until the end of November and then rose rapidly to 3*s.* 7½*d.* for sheet and 3*s.* 5*d.* for f. a. q. Venezuela block.

Gutta percha remained in limited demand at steady prices throughout the year.



India Rubber Journal

London Market Fluctuations of Spot Fine Hard Pará Ribbed Smoked Sheet During 1922

The reclaiming of old rubber has continued to be small owing to low crude rubber prices.

Plantation Rubber

Quality, Packing and Shipping

Many claims for mouldy rubber continue to come from New York, but most of the rubber sent to England on consignment has been of good quality and in good condition. While there is a distinct improvemcnt in the strength of the cases used the necessity of smooth planing inside them is emphasized. There is room for improvement in the working and sampling of rubber in New York.

Restricted Production for 1923

The 25 per cent restriction, which had been voluntarily carried out by the majority of the members of the Rubber Growers' Association during 1921, came to an end at the close of that year. Thereafter rubber output increased materially, the estimate being 20 per cent, principally in Malaya, the 1922 exports from which were about 88,000 tons over 1921.

It became evident that more rubber was being produced than could at present be consumed, and the government was early approached by both the British and Malayan growers' associations to adopt some form of restriction. The Stevenson plan, rejected by the Dutch but recommended by the British Government and adopted, effective November 1, 1922, by the Malay and Ceylon governments, was the result.

As is well known, the scheme starts with a restriction to 60 per cent of the year's crop from November 1, 1919, to October 31, 1920, the total crop figure accepted by the committee being 330,000 tons. Of this, voluntary or government control exercises restriction on some 265,000 tons. Of the total acreage owned by British companies in the Dutch East Indies, producing 25,000 tons, 86 per cent are provisionally pledged to support the restriction plan. Allowing for cases of special hardship and for young areas coming into bearing since 1920, both provided for by the scheme, it is estimated by S. Figgis & Co. that the output of plantation rubber from the East in 1923 will be about 280,000 tons, allowing for 80,000 tons of unrestricted rubber.

Lloyd, Matheson & Carritt estimate total 1923 world production as follows:

	Tons
60 per cent of full British Colonial output of 265,000 tons	159,000
60 per cent of full British estates in Dutch possessions of 25,000 tons	15,000
20 per cent increased output on Dutch estates of 40,000 tons	48,000
Increase from Brazil, Borneo, Sarawak, Indo-China, amounting in 1922 to 33,000 tons	40,000
Add for cases of special hardship and full output sold on forward contracts, say 10 per cent of British output	29,000
A total output of possibly	291,000

Every 5 per cent increase allowed under the restriction scheme would on this basis involve an additional annual output of 14,500 tons, or 1,208 tons per month.

Lloyd, Matheson & Carritt assert that the present restriction scheme has undoubtedly saved the loss of millions of British capital which the nation could ill afford to sacrifice. It has organized the industry and for the first time supplied reliable statistics of the trade. Its operation will maintain the balance between supply and demand, thereby stabilizing the price to the consumer and at the same time giving a fair margin of profit to the producer. It has improved the market position and established a feeling of confidence.

While there has been considerable criticism, the question has been treated too much as merely a matter of price between buyers and sellers of rubber. The fact that Malaya and Ceylon were sadly in need of revenue has often been overlooked, and it is pointed out that while British interests grow 85 per cent of the total rubber output, British buyers take only 20 per cent.

Acreage of Plantation Rubber

The estimated planted acreage of Hevea rubber shows a considerable increase, the census made at the end of 1921 having proved much larger than was expected, especially in native holdings. The estimated plantation acreages for the past three years follow:

	1920	1921	1922
Ceylon ..... *acres*	300,000	300,000	390,000
Malaya, Malacca	1,100,000	1,100,000	2,200,000
Borneo	50,000	50,000	50,000
Dutch East Indies	700,000	700,000	900,000
India and Burma	55,000	55,000	125,000
Former German Colonies: Samoa, East and West Africa, New Guinea, South Sea Islands	8,000	8,000	.....
Sarawak	.....	.....	25,000
French Indo-China and other countries	.....	.....	80,000
Total acres	2,213,000	2,213,000	3,770,000

Plantation Production

The total shipments of plantation rubber from the East are estimated by S. Figgis & Co. at 356,000 tons for the year 1922, against 268,000 tons in 1921, an increase of 106,500 tons. This total allows 15,000 tons for re-exports in Singapore from Java and Sumatra, which appear in the Malaya figures this year, and for 5,000 tons shipped direct from Burmah and India and not shown in the Ceylon figures. The following table shows the chief sources of plantation shipments for the past three years:

	1920	1921	1922
Malaya ..... *tons*	187,800	159,900	248,000
Ceylon and India	37,200	40,100	47,000
Java	31,000	29,600	32,000
Sumatra (Belawan)	22,400	29,900	39,000
Total	*287,500	*259,500	366,000

* These figures do not include shipments on through bills of lading from "outside" Malay ports via Singapore, that are very difficult to estimate.

India, Burmah and Mergui, with many plantations restricting, have exported about the same as last year. Shipments from Burmah were 1,700 tons, against 1,500 tons in 1921 and 2,060 tons in 1920.

Lloyd, Matheson & Carritt estimate total shipments at 379,000 tons, against 303,300 tons in 1921, an increase of 75,700 tons, as follows:

	1921	1922 (Estimated)	Increase
Malaya ..... *tons*	189,000	248,000	59,000
Ceylon	40,000	47,000	7,000
Sumatra	32,000	38,000	6,000
Java	29,000	31,000	2,000
India	5,000	5,500	500
French Indo-China	3,600	4,000	400
Sarawak	1,500	2,300	800
Borneo	3,200	3,200	.....
Total	303,300	379,000	75,700

Wild Rubber

South and Central American

Wild rubber generally, especially medium descriptions, has practically ceased to be shipped from all countries except the Amazon district. There has been little demand for medium Pará descriptions other than Caucho ball, which has been scarce and relatively high in price, though scarcely paying the cost of collection. The total rubber supply from Brazil shows a slight increase, but there is no advance in the use of fine Pará.

Total receipts in Pará from the Amazon, Bolivia, Peru, etc., for the past three years have been:

	1920	1921	1922
Brazil, Bolivia and Peru ..... *tons*	28,160	20,217	21,512
Including Peruvian and Caucho	6,471	4,843	4,080

The following table shows the annual receipts and shipments at Pará during the past three years:

	1920	1921	1922
Receipts of Pará ..... *tons*	21,690	15,374	17,432
Receipts of Caucho	6,471	4,843	4,080
Shipments to Europe	10,761	7,001	10,942
Shipments to the United States	18,262	10,838	10,760

African Rubber

Shipments from the Congo to Antwerp have increased a little, being 1,150 tons, against 700 tons in 1921 and 2,100 tons in 1920.

East Indian Rubber

Shipments of Sarawak jelutong are estimated at only 1,500 tons, against 2,400 tons in 1921. Its sale has been slow owing to the low price of rubber.

British Stocks

British stocks of all sorts on December 31, 1922, were 79,564 tons, of which 79,046 tons were plantations and 518 tons Pará and Peruvian. London stocks were 71,213 tons. This compares with a total of 79,843 tons at the end of 1921, of which 78,533 tons were plantations and 1,310 tons Pará and Peruvian. London stocks were 69,001 at the end of 1921. British imports of all

sorts for the year 1922 were 63,730 tons and deliveries 64,009 tons. Of these, 60,395 tons imported and 59,882 tons delivered were other than Pará and Peruvian. In 1921 British imports totaled 86,551 tons and deliveries 63,207 tons, of which 82,130 tons imported and 59,478 tons delivered were other than Pará and Peruvian.

Dutch Stocks

Dutch stocks of all descriptions on November, 1922, were 5,172 tons, against 8,941 tons on the same date in 1921 and 4,918 tons in 1920. Imports for the first ten months of 1922 were 7,584 tons and exports 9,447 tons, against imports of 14,857 tons and exports of 10,834 tons for the corresponding period of 1921.

American Imports

Imports of all descriptions into the United States, as compiled by the Rubber Association of America, totaled 290,970 tons in 1922, against 187,363 tons in 1921, 215,620 tons in 1920, and 226,032 tons in 1919. Of the 1922 imports, 276,649 tons were plantations; 11,092 tons, Parás; 2,691 tons, Africans; 135 tons, Centrals; 281 tons, Guayule; 122 tons, Maniçoba and Matto Grosso. Corresponding 1921 imports were: 173,975 tons, plantations; 10,915 tons, Parás; 2,329 tons, Africans; 81 tons, Centrals; 58 tons, Guayule; 5 tons, Maniçoba and Matto Grosso.

There may be added to the 1922 total 496 tons of balata, 4,924 tons miscellaneous, and 685 tons waste, as compared in 1921 with 581 tons of balata, 8,113 tons miscellaneous, and 4,989 tons waste.

World's Rubber Consumption

Although the Colonial Committee placed average annual world consumption at 300,000 tons, trade has improved considerably and Lloyd, Matheson & Carritt, in the absence of official figures, estimate actual consumption during 1922 in excess of that total as follows:

	1920	1921	1922 (Estimated)
United States ..... *tons*	248,791	179,647	275,000
United Kingdom	56,972	42,116	11,000
France	16,606	14,701	28,000
Germany	13,400	22,428	30,000
Italy	6,300	4,000	4,500
Canada	11,300	8,259	9,000
Japan	5,500	23,164	13,000
Rest	15,200	8,031	4,500
Total	374,069	302,346	375,000

As stocks have not increased to any appreciable extent in the consuming countries, imports should fairly indicate the absorbing power of each country, except the United Kingdom, which cannot be less than 30,000 tons, the average of the past three years. Since only 11,000 tons have been retained by the United Kingdom, invisible stocks must have been drawn upon to about 20,000 tons to fill the requirements of British manufacturers.

American imports for 1922, according to the Rubber Association of America, were 290,970 tons, an increase of 103,607 tons over the preceding year, due largely to the improved tire trade. This is not far from three-quarters of the world's total rubber production for the year. The revival of the motor trade continues in England, but to no such extent as in France, which in ten months to October took 23,000 tons, or well toward double the 14,800 tons for the whole of 1921. Germany has taken fully one-third more: 21,137 tons in nine months to September, against 21,583 tons for the whole of 1921. Japan took less: 11,719 tons for nine months to September, against 16,368 tons for the same period of 1921. These figures, considering the economic situation in Europe, are very satisfactory and show room for considerably increased consumption when the financial position improves.

To estimate future American consumption accurately, S. Figgis & Co. assert that a longer period than one year must be taken into account. During the past three years there has been a natural average yearly increase of 10 per cent. That a period of great activity and price inflation is in progress must not be forgotten, nor the largely increased automobile output. During the first eleven months of the past year 2,344,000 cars were produced, against the previous high record of 1920 when 2,205,000 cars were produced in the whole year.

The World's Total Stocks

Despite an increased production variously estimated at 80,000 to 100,000 tons, total stocks appear to be no larger at the end of the year than at the beginning. The Colonial Committee's report, published in June, gave authentic figures from information not generally obtainable, as follows:

Stock in consuming countries ..... *tons*	210,000
Stock in producing countries	60,000
Stock afloat	40,000
Total	310,000
Normal stock	200,000
Surplus stock	110,000

Lloyd, Matheson & Carritt give the most recent available statistics and estimates as follows:

	Jan. 1, 1922	July 1, 1922
Stock in United States (Rubber Association of America) ..... *tons*	94,774	82,110
Stock in United Kingdom	79,661	71,000
Stock afloat	40,300	43,000
Stock in producing countries (Government census) ..	60,000	50,000
Total	274,735	246,110

The difference of some 35,000 tons between the Colonial Committee's total and that for January 1, 1922, might easily be accounted for by stocks in European ports, possibly 10,000 tons, and invisible stocks in England, which must have been drawn upon for some 20,000 tons during the past year and were larger than generally realized.

Since July British stocks increased considerably, mostly during the last two weeks of the year, the result of shipments made in anticipation of restriction.

British rubber stocks in London and Liverpool at the end of 1922, reported by S. Figgis & Co. as 79,564 tons, are only 279 tons less than at the end of the preceding year, but the invisible stocks must be greatly reduced on account of large sales by a manufacturer. Stocks in the East are much reduced owing to shipments hurried forward before the restriction plan became effective.

America during 1922 replenished her depleted stocks of manufactured goods and rather increased her stock of crude rubber, which at the end of 1921 was returned as 94,774 tons, and in June last from incomplete figures as 82,110 tons.

The 1923 Outlook

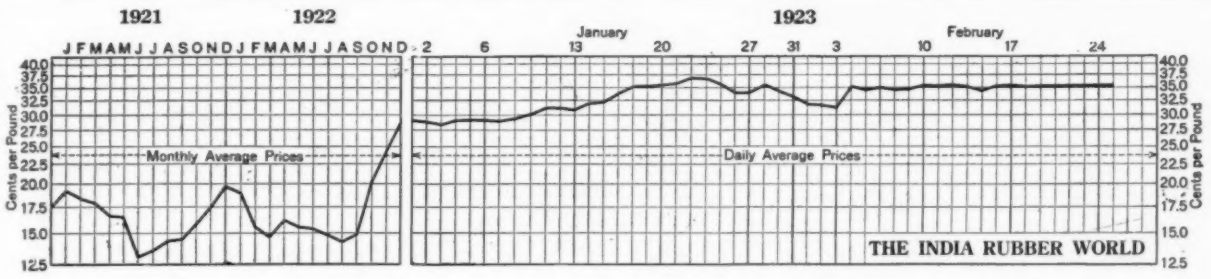
Lloyd, Matheson & Carritt estimate the world's crude rubber requirements for 1923, dependent on European trade revival, at 380,000 to 400,000 tons, of which America will probably require 280,000 tons. With consumption possibly requiring 80,000 tons more than output for the year, surplus stocks must soon disappear, and the outlook is consequently brighter than for a long time past.

BRAZIL AIDS RUBBER FACTORY

Brazil has provided a substantial subsidy for the Companhia Brazileira de Artefactos de Borracha, Rio de Janeiro. To receive this aid the company must install additional machinery and have the plant in operation within two years and consume at least 20 metric tons of Brazilian rubber per year. The company is to be guaranteed a return of 6 per cent on the capital invested for three years. Additional premiums are also provided for.—*Commerce Reports.*

GUAYULE PRODUCTION BEGINS

The Continental Mexican Rubber Co. has commenced to produce guayule at the new unit located on the Hacienda Cedros, in Zacatecas, Mexico, about one hundred miles south of Torreon. These operations will probably continue until the end of May.



Ratio Graph of New York Market Fluctuations—Average Prices of Ribbed Smoked Sheets

Review of the Crude Rubber Market

New York

A MONTH ago New York spot price on ribbed smoked sheets reached 37½ cents a pound and at that date heavy buying ceased. February is usually a dull period in the crude rubber market and has proved so the past month. Greater activity and higher prices are looked for in March. The week ending February 3, showed a steady decline in price of smoked sheets from 36⅜ to 34¼, dullness characterizing the latter half of the week owing to the lack of interest on the part of both dealers and factories.

During the week of February 10 trade was extremely dull and prices virtually stationary at around 35 cents a pound. Factories are supplied with their rubber requirements for the nearby months and show no interest.

Early in the week of February 17 prices sagged off fractionally but recovered later in the week in response to the higher tendency reported from London. The week closed with smoked sheets at 35¼ cents a pound. The following week was also extremely quiet. Almost no trading took place among the dealers except for odd lots and off grades. There was no factory demand except for scattering odd lots.

The month closed with the market deadlocked, as consumers would not buy, and holders refused to cut prices as foreign quotations were higher than the New York market. The rumor that restriction was to be lifted temporarily broke the market which quickly recovered. Low offers were promptly accepted and sellers then withdrew.

Parás declined and fluctuated in price throughout the month in sympathy with plantations, the variation in upriver fine ranging downward one cent from 34½ cents. Balata has shown a decline during February of 4 to 5 cents a pound on both Surinam and block qualities.

Imports of all grades during January were 31,197 tons, compared with 21,867 tons one year ago. Plantation arrivals for January were 29,354 tons, compared with 20,774 tons, for January one year ago.

W. H. Rickinson & Son, London, express the following interesting conclusions on the rubber situation.

Plantation production from November, 1919, to October, 1920, inclusive was 330,000 tons. Of this amount 250,000 tons is under British export duty control, and the remaining 80,000 tons under that of the Netherlands and other countries. There was a surplus of about 110,000 tons of rubber early in 1922. At the beginning of 1923 the surplus in the United Kingdom was estimated at 70,000 to 80,000 tons. If the output of rubber under export control should not exceed 70 per cent of standard production there will be a shortage of about 70,000 tons for 1923. In order to meet this shortage it will be necessary to permit British plantations to produce 110 per cent of standard production or 275,000 tons. By the end of 1924 with unrestricted tapping they could produce 310,000 tons.

The price of rubber during 1923 depends on what is done with the surplus stock. If it is withheld higher prices will result and doubtless bring the surplus into the market. Until the surplus is disposed of, 70 per cent of standard production should not be exceeded. The key to the position is, therefore, the stocks in the United Kingdom.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS. February 1. Spot first latex crêpe, 34¼ cents; Mar., 34⅜ cents; Apr.-June, 35¼ cents; July-Sept., 36 cents. February 24. Spot first latex crêpe, 35 cents; Mar., 35¼ cents; Apr.-June, 36 cents; July-Sept., 36½-37 cents; Oct.-Dec., 37½-38 cents.

February 1. Spot ribbed smoked sheets, 34¼ cents; Mar., 34⅜ cents; Apr.-June, 35¼ cents; July-Sept., 36 cents. February 24. Spot ribbed smoked sheets, 35 cents; Mar., 35¼ cents; Apr.-June, 36 cents; July-Sept., 36½-37 cents; Oct.-Dec., 37½-38 cents.

February 1. Spot, No. 1 amber crêpe, 33½ cents; Mar., 33⅜ cents; Apr.-June, 34 cents. February 24. Spot No. 1 amber crêpe, 34½ cents; Mar., 35 cents; Apr.-June, 36 cents.

February 1. Spot No. 1 rolled brown crêpe, 31½ cents; Mar., 32 cents; Apr.-June 32½ cents. February 24. Spot No. 1 rolled brown crêpe, 32 cents; Mar., 32¼ cents; Apr.-June, 33 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. February 1. Spot, upriver fine, 33¼ cents; islands fine, 28 cents; upriver coarse, 26¾ cents; island coarse, 17¼ cents; Cametá, 16½ cents; caucho ball, 29 cents. February 24. Spot, upriver fine, 34 cents; islands fine, 30 cents; upriver coarse, 28½ cents; islands coarse, 17¼ cents; Cametá, 17¼ cents; caucho ball, 29-30 cents.

London

About January 24 the market was 18¼ pence, with British rubber growers buying to meet contracts of the present quarter. The following week this price declined fractionally, attributed to large increase in offerings by speculative holders, a general withdrawal of buyers and a decline of about 2 cents a pound in the Singapore market. Early in the second week of February the price recovered to 18 pence, due to announcement by the British Colonial Office that the minimum duty limit for rubber exports from the F. M. S. will remain unchanged at 60 per cent of capacity for the present quarter, which dates from February 1. The immediate effect was to stimulate buying. The third and fourth weeks trading was quiet with absence of developments, the price varying between 17⅝ and 17⅞ pence a pound.

A rumor of some modification of the Stevenson Plan caused a temporary weakness, but the market soon recovered.

Crude Rubber Market—*Continued*

New York Quotations

Following are the New York spot quotations per pound, for one year, one month ago, and February 24, the current date:

Plantation Hevea	February 1, 1922	February 1, 1923	February 24, 1923
LATEX			
Rubber latex (Hevea)	@	*per gal.* $1.25	*per gal.* $1.25@1.35
CREPE			
First latex	$0.16½@	$0.34¼@	$0.35 @.35¼
Off latex	.16 @	.34 @	.34¼@.35
Amber No. 1	.16 @	.33½@	.34½@.34¾
Amber No. 2	.15½@	.33 @	.34 @.34¼
Amber No. 3	.15¼@	.32½@	.33½@.33¾
Brown, thick, thin, clean	.15¼@	.32½@	.34¼@.34½
Brown, specky	.15½@	.32 @	.33 @
Brown, rolled	.15 @	.31½@	.32 @.32¼
SHEET			
Smoked, ribbed	.16½@	.34¼@	.35 @.35¼
Smoked, plain	.15½@	.33 @	†.34 @
Unsmoked	.15 @	.32 @	†.33 @
SCRAP			
Colombo scrap No. 1	@	.29 @	†.29 @
Colombo scrap No. 2	@	.28 @	†.28 @
East Indian			
PONTIANAK			
Banjermassin	.08½@	.08¼@	.08 @
Pressed block	.13 @	.07¾@	.14 @
Sarawak	.07 @	.07½@	.07½@
South American			
PARAS			
Upriver fine	.20 @	.33¼@	.34 @
Upriver fine*	@	*.46¾@	@
Upriver medium	.17¼@	.29 @	.30½@
Upriver coarse	.13 @	.26¼@	.28½@
Upriver, weak, fine	.17 @	.30 @	@
Islands fine	.19 @	.28 @	.30 @
Islands fine*	@	*.45 @	@
Islands medium	.17 @	.25½@	.27½@
Islands coarse	.09½@	.17¼@	.17¼@
Cametá	.09½@	.16½@	.17¼@
Cametá*	@	*.40 @	@
Acre Bolivian fine	.21 @	.35 @	.34 @
Acre Bolivian fine*	@	*.46¾@	*.42 @
Beni Bolivian	.21 @	.35¼@	.34 @
Madeira fine	.22 @	.34 @	.34½@
Peruvian fine	.19 @	.32 @	.31½@
Tapajos fine	.19 @	.33 @	.31½@
CAUCHO			
Upper caucho ball	.12 @	.30 @	.30 @
Upper caucho ball*	@	*.42 @	*.40 @
Lower caucho ball	.11 @	.29 @	.29 @
Manicobas			
Ceará negro heads	†.11 @	†.27 @	.27 @
Ceará scrap	†.07 @	†.25 @	.15 @
Manicoba 30%, guaranty	†.08½@	†.20 @	.26 @
Mangabeira, thin sheet	†.14 @	†.27 @	.30 @
Centrals			
Central scrap	.13 @	.27 @.28	@
Central scrap and strip	.10 @	.26 @.27	@
Central wet sheet	.04 @	.20 @.24	.22 @
Corinto scrap	.13 @	.27 @.28	.26 @.27
Esmeralda sausage	.13 @	@	.26 @.27
Guayule washed and dried	.26 @	.29 @	.29 @
Africans			
Benguela, No. 1, 28½%	@	.23 @	.20 @
Benguela, No. 2, 32½%	†.07 @.08	.20 @	.18 @
Congo prime, black upper	@	.30 @	.29 @
Congo, prime, red upper	@	.27 @	.26 @
Kassai, black	†.11 @.12	.28 @	.28 @
red	†.11 @.12	.26 @	.25 @

*Washed and dried crêpe. Shipment from Brazil.
†Nominal.

Gutta Percha	February 1, 1922	February 1, 1923	February 24, 1923
Gutta Siak	.17½@.18	.21 @	.20½@.21½
Red Macassar	2.75 @3.00	3.00 @	3.00 @
Balata			
Block, Ciudad Bolivar	.55 @	.74 @	.75 @.78
Colombia	.43 @	.62 @	.64 @.67
Panama	.43 @	.62 @	.64 @.67
Surinam, sheet	.68½@	.86 @	.88 @
amber	.72 @	.89 @	.93 @
Chicle			
Colombia	@	.25 @.30	.25 @.30
Honduras	@	.62 @	.62 @
Venezuela	@	.63 @	.63 @
Yucatan fine	@	.65 @	.65 @

Comparative Low and High New York Spot Rubber Prices

	February					
PLANTATIONS	1923*		1922		1921	
First latex crêpe	$0.33½@$0.35¼		$0.15 @$0.16¼		$0.19½@$0.20	
Smoked sheet, ribbed	.33½@	.35¼	.15 @	.16¼	.17½@	.19
PARA						
Upriver, fine	.33 @	.36	.16¼@	.18½	.17 @	.17½
Upriver, coarse	.25 @	.28	.12 @	.13¼	.13¼@	.14
Islands, fine	.30 @	.32	.16 @	.17½	.17 @	.17½
Islands, coarse	.16 @	.25	.07¼@	.10	.11 @	.11½
Cametá	.14 @	.18	.07 @	.12	.11 @	.12

*Figured to February 26, 1923.

Reclaimed Rubber

Practically every grade of reclaim has advanced in price, due to consumers demand stimulated by the strong position of crude rubber. Reclaim has been restored generally to its former status as a compounding ingredient of important plastic value, a position from which it had been largely displaced because of the excessively low range of prices for crude during the period of March to October of last year. All reclaiming plants are virtually on capacity production at the present time.

Revised quotations are as follows:

New York Quotations

February 24, 1923

Prices subject to change without notice

STANDARD RECLAIMS

Floating	$0.16	@	$0.17
Friction	.24	@	.25
Mechanical	.10	@	.12
Shoe, unwashed	.12	@	.12½
Tires, auto	.10	@	.10½
truck	.09½	@	.10
White	.14	@	.15

British Malaya Rubber Exports

It is reported officially from Singapore that 31,230,100 pounds (22,871 tons) of rubber were exported in January from British Malayan ports, as compared with 18,427 tons in December, and 18,962 tons in the corresponding month last year.

Transhipments amounted to 3,487,800 pounds (1,557 tons), and foreign imports to 9,760,900 pounds (4,358 tons).

New York Average Spot Rubber Prices

PRICES IN CENTS PER POUND

	January, 1923									February, 1923													
PLANTATIONS	22	23	24	25	26	27	29	30	31	1	2	3	5	6	7	8	9	10	12*	13	14	15	16	17
Sheet																								
Ribbed smoked	35⅞	37¼	36⅞	36¼	34¼	34¼	36	34⅝	33½	34	33⅞	34¾	35¼	34¾	35⅛	34⅞	34⅞	35¼	....	35⅝	35	34⅞	35¼	35¼
Crêpe																								
First latex	35⅞	37¼	36⅞	36½	34½	34¾	36	34⅝	33½	34	33⅞	34¾	35⅜	34¾	35⅛	34⅞	34⅞	35½	....	35⅜	35	34⅞	35¼	35¼
Off latex	35⅜	36½	36½	35½	33⅝	34½	35½	34	32⅞	33½	33¼	34¼	34⅜	34½	34⅝	34⅜	34⅜	34⅝	....	34⅜	34⅜	34½	34⅜	34¾
No. 1 blanket	35⅜	36⅜	36¼	36⅛	33⅞	34⅜	35⅜	34⅛	33⅛	33⅜	33⅛	33⅞	34⅛	34⅛	34⅜	34⅛	34⅜	34⅝	....	34⅜	34⅜	34⅜	34⅜	34¾
No. 2 blanket	35½	36⅜	36¼	35½	33¾	33⅞	35½	33⅜	32⅜	33⅛	33⅛	33⅞	34½	33⅜	33⅝	33⅜	33⅞	34½	....	34⅜	34⅜	33⅞	34½	34⅜
No. 3 blanket	34⅞	36	35¾	35⅛	32⅞	33¾	34¾	33¼	32¼	32⅜	32¾	33⅛	33⅞	33	32¾	33¼	33⅜	33¾	....	33¾	33⅜	33½	33⅞	34
Thin, clean, brown	35½	35¼	35¾	35½	33¾	33⅞	34½	33¾	31⅜	32⅞	32⅞	33½	34½	33½	33⅜	33¾	33⅜	34	....	34	34	33¾	34½	34½
Specky brown	34½	35¼	35½	34⅜	32⅜	33	33½	32½	31⅜	31¾	31⅜	32¾	33⅛	32⅞	32¼	33	32⅞	32⅞	....	33½	33	32½	33⅜	33⅜
Rolled brown	32¾	33½	34	33⅜	32	32½	33⅛	31⅞	30¾	31½	31½	31⅜	32½	32½	32¼	32	32⅛	32½	....	32⅜	32½	32⅛	32⅜	32¼

*Holiday.

Crude Rubber Arrivals at New York as Stated by Ships' Manifests

Parás and Caucho

	Fine	Medium	Coarse	Caucho	Totals Pounds
JANUARY 21. By "Dunstan," Pará and Manáos.					
General Rubber Co.	....	....	....	....	‖28,000
Meyer & Brown, Inc.	¶22,400	....	4,480	6,720	33,600
Ultramares Corporation	3,479	....	....	....	3,479
JANUARY 25. By "Cameons," Pará and Brazil.					
F. R. Henderson & Co., Inc.	10,350	6,720	21,300	....	38,370
L. Littlejohn & Co., Inc.	190,400	....	....	....	190,400
Meyer & Brown, Inc.	¶87,360	....	....	....	87,360

	Fine	Medium	Coarse	Caucho	Totals Pounds
FEBRUARY 3. By "Polycarp," Pará, Iquitos and Manáos.					
General Rubber Co.	....	....	....	2,240	‖6,720
F. R. Henderson & Co., Inc.	33,640	9,980	31,360	....	74,980
L. Littlejohn & Co., Inc.	403,200	....	....	....	403,200
Meyer & Brown, Inc.	¶188,160	....	....	....	188,160
Ultramares Corporation	16,742	345	306	2,033	19,426

‖Cametá. ¶Fine and medium. §Includes 4,480 lbs. of Cametá.

Plantations

(Figured at 180 lbs. to the bale or case.)

	Pounds	Totals
JANUARY 17. By "Olympic," Liverpool.		
Various	3,060	3,060
JANUARY, 19. By "Zarembo," Havre.		
Various	16,380	16,380
JANUARY, 20. By "Manhattan," London.		
Various	75,780	75,780
JANUARY 21. By "Caucasier," Antwerp.		
Various	15,400	15,400
JANUARY 23. By "Scythia," Liverpool.		
Various	46,800	46,800
JANUARY 23. By "City of Brisbane," Far East.		
L. Littlejohn & Co., Inc.	436,800	
Charles T. Wilson Co., Inc.	123,200	
Various	188,080	748,080
JANUARY, 23. By "London Mariner," London.		
Various	4,500	4,500
JANUARY 23. By "Dakarian," London.		
Various	7,020	7,020
JANUARY 23. By "Gaasterdyk," Rotterdam.		
Various	14,760	14,760
JANUARY 26. By "Reiyo Maru," Far East.		
Baird Rubber & Trading Co., Inc.	33,600	
F. R. Henderson & Co., Inc.	156,800	
L. Littlejohn & Co., Inc.	517,400	
Fred Stern & Co., Inc.	145,304	
Charles T. Wilson Co., Inc.	82,880	
H. Muehlstein & Co., Inc.	11,200	
Various	279,156	1,226,340
JANUARY 26. By "Bandoeng," Far East.		
Fisk Rubber Co.	358,708	
General Rubber Co.	329,558	
F. R. Henderson & Co., Inc.	62,720	
L. Littlejohn & Co., Inc.	1,133,400	
Fred Stern & Co., Inc.	238,404	
Charles T. Wilson Co., Inc.	100,800	
H. Muehlstein & Co.	235,200	2,458,790
JANUARY 26. By "The Lambs," Far East.		
Baird Rubber & Trading Co., Inc.	22,400	
General Rubber Co.	595,524	
L. Littlejohn & Co., Inc.	996,800	
H. Muehlstein & Co., Inc.	190,400	
Fred Stern & Co., Inc.	22,400	
Charles T. Wilson Co., Inc.	179,200	
Various	*13,140	
Various	2,052,996	4,072,860
JANUARY 26. By "City of Birmingham," Far East.		
General Rubber Co.	168,000	
Hood Rubber Co.	22,270	
L. Littlejohn & Co., Inc.	616,000	
H. Muehlstein & Co., Inc.	56,000	
Various	253,370	1,115,640
JANUARY 26. By "Teucer," Far East.		
Anglo-Eastern Trading Co., Inc.	67,270	
Baird Rubber & Trading Co., Inc.	285,600	
Fisk Rubber Co.	44,820	
General Rubber Co.	546,560	
F. R. Henderson & Co., Inc.	557,000	
J. T. Johnstone & Co., Inc.	155,679	
L. Littlejohn & Co., Inc.	1,693,440	
Meyer & Brown, Inc.	145,600	
H. Muehlstein & Co., Inc.	190,400	
Fred Stern & Co., Inc.	80,331	
Charles T. Wilson Co., Inc.	649,600	
Various	*570,960	
Various	3,342,780	8,330,040
JANUARY 26. By "Rotterdam," Rotterdam.		
L. Littlejohn & Co., Inc.	268,800	
Fred Stern & Co., Inc.	11,144	279,944
JANUARY 27. By "Penang Maru," Far East.		
Fisk Rubber Co.	224,000	
Fred Stern & Co., Inc.	11,200	
Various	47,760	282,960

*Arrived at Boston.
†Arrived at Baltimore.
‡Arrived at San Francisco.

	Pounds	Totals
JANUARY 28. By "Diana Dollar," Far East.		
Anglo-Eastern Trading Co., Inc.	22,400	
Baird Rubber & Trading Co., Inc.	112,000	
Fisk Rubber Co.	6,720	
General Rubber Co.	168,000	
Hood Rubber Co.	*67,200	
J. T. Johnstone & Co., Inc.	12,320	
L. Littlejohn & Co., Inc.	750,200	
Meyer & Brown, Inc.	78,400	
H. Muehlstein & Co. Inc.	67,200	
Fred Stern & Co., Inc.	61,325	
Charles T. Wilson Co., Inc.	78,400	
Various	†559,260	
Various	650,035	2,633,460
JANUARY 28. By "Amur Maru," Far East.		
Baird Rubber & Trading Co., Inc.	33,600	
F. R. Henderson & Co., Inc.	436,800	
L. Littlejohn & Co., Inc.	382,000	
H. Muehlstein & Co., Inc.	22,400	
Various	224,000	2,098,800
JANUARY 28. By "Edgehill," Far East.		
Charles T. Wilson Co., Inc.	22,400	22,400
JANUARY 29. By "Maine," London.		
General Rubber Co.	571,200	
Various	*8,640	
Various	127,920	707,760
JANUARY 29. By "West Chopaka," Far East.		
Charles T. Wilson Co., Inc.	‡153,440	153,440
JANUARY 29. By "Virgilia," London.		
Various	16,380	16,380
JANUARY 30. By "La Bordonnais," Havre.		
Poel & Kelly, Inc.	791,820	
Various	360	792,180
JANUARY 30. By "Kendall Castle," Far East.		
Anglo-Eastern Trading Co., Inc.	33,600	
Baird Rubber & Trading Co., Inc.	162,700	
Fisk Rubber Co.	38,048	
General Rubber Co.	823,522	
F. R. Henderson & Co., Inc.	676,480	
Adolph Hirsch & Co., Inc.	11,200	
L. Littlejohn & Co., Inc.	1,915,200	
Meyer & Brown, Inc.	452,480	
H. Muehlstein & Co., Inc.	304,640	
Fred Stern & Co., Inc.	60,522	
Charles T. Wilson Co., Inc.	280,000	
Various	*90,000	
Various	3,174,748	8,023,140
JANUARY 30. By "Tyrrhenia," London.		
General Rubber Co.	11,200	
Various	17,960	29,160
JANUARY 31. By "City of Bombay," Far East.		
Fisk Rubber Co.	158,728	
F. R. Henderson & Co., Inc.	33,600	
L. Littlejohn & Co., Inc.	459,200	
H. Muehlstein & Co., Inc.	268,800	
Fred Stern & Co., Inc.	11,200	
Charles T. Wilson Co., Inc.	183,680	
Various	637,812	1,753,020
FEBRUARY 1. By "City of Lahore," Far East.		
F. R. Henderson & Co., Inc.	22,400	
L. Littlejohn & Co., Inc.	623,920	
L. Littlejohn & Co., Inc.	*11,200	
Meyer & Brown, Inc.	56,000	
Fred Stern & Co., Inc.	15,680	
Charles T. Wilson Co., Inc.	22,400	
Various	*39,200	
Various	113,520	904,320
FEBRUARY 1. By "Mauretania," Liverpool.		
Various	1,080	1,080
FEBRUARY 3. By "Agapenor," Far East.		
Anglo-Eastern Trading Co., Inc.	22,260	
Baird Rubber & Trading Co., Inc.	131,000	
Fisk Rubber Co.	124,099	
General Rubber Co.	321,583	
F. R. Henderson & Co., Inc.	414,400	
Hood Rubber Co.	*78,400	
J. T. Johnstone & Co., Inc.	119,203	
L. Littlejohn & Co., Inc.	3,225,600	
Meyer & Brown, Inc.	82,880	

	Pounds	Totals
Fred Stern & Co., Inc.	161,648	
Charles T. Wilson Co., Inc.	44,800	
Various	*137,060	
Various	1,770,607	6,633,540
FEBRUARY 3. By "Quebec City," Hamburg.		
L. Littlejohn & Co., Inc.	56,000	56,000
FEBRUARY 4. By "Noordam," Rotterdam.		
L. Littlejohn & Co., Inc.	134,400	
Various	85,820	220,220
FEBRUARY 4. By "Glen Ridge," Rotterdam.		
Various	34,760	34,760
FEBRUARY 5. By "Poleric," Far East.		
Fisk Rubber Co.	11,200	
L. Littlejohn & Co., Inc.	11,200	
Charles T. Wilson Co., Inc.	184,800	
Various	30,940	238,140
FEBRUARY 5. By "Thuringia," Hamburg.		
Various	80,100	80,160
FEBRUARY 8. By "President Adams," London.		
Various	5,580	5,580
FEBRUARY 10. By "M. S. Dollar," Far East.		
Baird Rubber & Trading Co., Inc.	112,000	
Continental Rubber Co. of New York	*52,500	
Continental Rubber Co. of New York	59,500	
Fisk Rubber Co.	174,600	
General Rubber Co.	487,700	
F. R. Henderson & Co., Inc.	548,800	
Hood Rubber Co.	*235,420	
J. T. Johnstone & Co., Inc.	56,918	
L. Littlejohn & Co., Inc.	3,225,600	
Meyer & Brown, Inc.	224,000	
H. Muehlstein & Co.	291,200	
Fred Stern & Co., Inc.	84,472	
Charles T. Wilson Co., Inc.	176,960	
Charles T. Wilson Co., Inc.	*33,600	
Various	1,841,050	7,604,320
FEBRUARY 11. By "Tottori Maru," Yokohama.		
Various	351,000	351,000
FEBRUARY 11. By "City of Canton," Far East.		
Baird Rubber & Trading Co., Inc.	181,400	
General Rubber Co.	329,280	
F. R. Henderson & Co., Inc.	296,800	
Adolph Hirsch & Co., Inc.	22,400	
Hood Rubber Co.	*1,764	
J. T. Johnstone & Co., Inc.	322,991	
L. Littlejohn & Co., Inc.	2,665,600	
L. Littlejohn & Co., Inc.	*44,800	
Meyer & Brown, Inc.	159,040	
H. Muehlstein & Co., Inc.	145,600	
Fred Stern & Co., Inc.	88,720	
Charles T. Wilson Co., Inc.	*33,600	
Charles T. Wilson Co., Inc.	60,480	
Various	2,800,249	7,152,724
FEBRUARY 12. By "Barbadian," Far East.		
L. Littlejohn & Co., Inc.	11,200	
Meyer & Brown, Inc.	11,200	
Various	157,240	179,640
FEBRUARY 12. By "Vardulia," London.		
General Rubber Co.	555,520	
Various	692,600	1,248,120
FEBRUARY 16. By "City of Batavia," Far East.		
L. Littlejohn & Co., Inc.	593,600	593,600
FEBRUARY 19. By "Gaelic Prince," Far East.		
L. Littlejohn & Co., Inc.	67,200	
Meyer & Brown, Inc.	416,640	483,840

Rubber Latex

JANUARY 15. By "Kentucky," Singapore.	
Various	1 crate
JANUARY 23. By "Dakarian," London.	
Sorenson & Nielson	43 cases
Sorenson & Nielson	45 jars
JANUARY 26. By "Bandoeng," Batavia.	
Various	1 drum
JANUARY 26. By "The Lambs," Sourabaya.	
Various	40,000 gal.
FEBRUARY 10. By "M. S. Dollar," Colombo.	
Various	1 bbl.
FEBRUARY 11. By "City of Canton," Singapore.	
Various	63 cases

Exports of India Rubber Manufactures from the

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed and Auto Cloths and Auto Topping Value
EUROPE													
Austria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belgium	$10,222	$2,268	$1,129	$5,510	6	$26	.....	.....	.....	.....	$12	$2,840	$3,140
Denmark	199	203	658	.....	.....	.....	7,804	$7,201	.....	.....	.....	1,010	102
Esthonia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Finland	6,297	.....	73	.....	.....	.....	.....	.....	.....	.....	16	.....	.....
France	8,707	32	182	33,457	.....	.....	.....	.....	.....	.....	67	30,382	.....
Germany	2,209	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gibraltar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greece	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iceland and Faroe Islands	.....	.....	.....	.....	631	1,830	.....	.....	.....	.....	.....	.....	.....
Italy	117	.....	.....	4,958	430	1,374	64	43	.....	.....	100	4,537	.....
Jugoslavia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Latvia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lithuania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Malto, Gozo, etc	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	770
Netherlands	295	472	53	622	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norway	1,088	.....	.....	.....	360	900	2,811	1,763	160	$130	295	3,550	1,189
Portugal	.....	181	.....	.....	150	450	.....	.....	.....	.....	199	.....	.....
Rumania	.....	4,139	175	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Russia in Europe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spain	161	.....	.....	3,640	.....	.....	.....	.....	60	67	2,551	7,483	.....
Sweden	2,191	268	.....	257	60	144	.....	.....	.....	.....	806	17,791	.....
Switzerland	25	.....	.....	1,884	.....	.....	647	383	.....	.....	.....	1,343	351
Turkey in Europe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
England	6,594	12,152	2,866	66,623	9,720	17,766	1,152	488	37,554	23,709	13,752	18,718	11,001
Scotland	857	.....	419	.....	108	193	24	20	288	215	.....	7,949	.....
Ireland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, EUROPE	$38,962	$19,741	$5,555	$116,951	11,465	$22,683	12,502	$9,898	38,062	$24,121	$17,798	$95,653	$16,553
NORTH AMERICA													
Canada—Maritime Provinces	.....	$182	$29	.....	73	$262	146	$200	12	$27	$5	$203	$261
Quebec and Ontario	$11,482	8,202	5,601	$5,548	238	1,186	478	1,119	19,208	16,014	843	14,229	25,745
Prairie Provinces	.....	1,248	29	.....	.....	.....	120	194	.....	.....	.....	993	239
Brit. Columbia and Yukon	1,114	358	267	.....	843	3,995	104	205	149	98	.....	110	.....
British Honduras	99	48	.....	.....	.....	.....	.....	.....	812	285	.....	.....	11
Costa Rica	65	210	12	.....	.....	.....	.....	.....	.....	.....	1,002	416	70
Guatemala	443	96	111	.....	.....	.....	18	20	408	209	828	213	404
Honduras	207	329	271	.....	50	137	226	228	500	497	453	173	.....
Nicaragua	680	30	10	.....	.....	.....	24	24	757	746	908	.....	.....
Panama	476	278	276	.....	24	84	.....	.....	3,946	2,953	899	311	390
Salvador	575	680	251	.....	.....	.....	130	78	648	653	4,785	227	84
Mexico	14,000	14,729	8,500	.....	42	197	614	810	10,200	8,788	21,381	2,649	1,152
Miquelon and St. Pierre Islands	.....	.....	.....	.....	144	484	.....	.....	.....	.....	.....	.....	.....
Newfoundland and Labrador	553	169	.....	.....	1,752	4,379	2,400	2,338	24	16	.....	.....	.....
Bermuda	.....	.....	.....	.....	4	11	138	98	8	9	326	82	73
Barbados	.....	.....	.....	.....	.....	.....	.....	.....	624	501	.....	.....	18
Jamaica	.....	785	478	.....	.....	.....	.....	.....	1,301	1,167	2,777	114	1,075
Trinidad and Tobago	192	346	204	.....	.....	.....	48	29	220	265	60	.....	.....
Other British West Indies	.....	2,196	324	.....	.....	.....	440	278	7,806	7,077	260	22	58
Cuba	1,091	5,716	7,186	17	26	57	24	20	70,205	47,744	3,443	8,930	8,274
Dominican Republic	470	1,502	78	.....	.....	.....	240	227	1,132	1,167	651	1.059	47
Dutch West Indies	.....	256	94	.....	.....	.....	185	136	2,911	2,046	273	.....	.....
French West Indies	28	150	.....	.....	2	7	.....	.....	.....	.....	.....	.....	.....
Haiti	.....	24	33	.....	.....	.....	.....	.....	85	114	88	356	.....
Virgin Islands of United States	.....	.....	.....	.....	.....	.....	.....	.....	403	332	18	.....	.....
TOTALS, NORTH AMERICA	$31,475	$37,534	$23,754	$5,565	3,198	$10,799	5,335	$6,004	121,359	$90,708	$39,000	$30,087	$37,901
SOUTH AMERICA													
Argentina	$5,605	$4,963	$2,928	$102	.....	.....	6,108	$4,630	35,050	$26,094	$5,541	$3,652	$12,879
Bolivia	233	657	.....	.....	.....	.....	.....	.....	.....	.....	.....	302	130
Brazil	7,029	4,800	1,157	.....	16	$52	615	372	64	46	.....	2,851	457
Chile	4,510	673	.....	.....	.....	.....	.....	.....	213	266	.....	2,654	225
Colombia	192	429	299	.....	.....	.....	288	371	6,268	4,223	2,334	3,106	9
Ecuador	100	502	13	.....	.....	.....	.....	.....	6,772	4,145	.....	526	.....
British Guiana	.....	226	.....	.....	.....	.....	.....	.....	2,571	2,523	.....	.....	196
Dutch Guiana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
French Guiana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	131
Peru	2,856	1,256	.....	.....	556	3,143	74	215	.....	.....	203	1,253	884
Uruguay	.....	.....	.....	.....	24	99	530	475	3,656	2,281	790	192	600
Venezuela	80	2,561	1,091	.....	.....	.....	312	220	.....	.....	1,654	1,462	130
TOTALS, SOUTH AMERICA	$20,605	$16,067	$5,488	$102	596	$3,294	7,927	$6,283	54,594	$39,578	$10,522	$15,998	$15,641
ASIA													
British India	$1,236	$933	$225	.....	.....	.....	.....	.....	2,377	$3,013	$48	$826	$47
Ceylon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	54	114	.....
Straits Settlements	138	.....	.....	.....	.....	.....	.....	.....	96	67	.....	900	.....
Other British East Indies	90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
China	526	613	.....	.....	.....	.....	212	$192	538	427	.....	1,223	3,663
Chosen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Java and Madura	124	.....	42	.....	.....	.....	.....	.....	599	512	.....	1,794	3,015
Other Dutch East Indies	.....	2,099	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
French Indo-China	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hejaz, Arabia, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hongkong	.....	31	269	.....	.....	.....	.....	.....	816	641	.....	.....	.....
Japan	.....	3,393	8,662	$10,293	2	$10	3,480	2,864	670	890	.....	3,900	3,237
Kwantung, leased Territory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Palestine and Syria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	484
Persia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Siam	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, ASIA	$2,114	$7,069	$9,198	$10,293	2	$10	3,692	$3,056	5,096	$5,550	$102	$8,757	$10,446

United States by Countries During December, 1922

Waterproofed Clothing Value	Pneumatic Casings: Automobile Number	Pneumatic Casings: Automobile Value	Pneumatic Casings: Others Value	Solid Tires: Automobile Value	Solid Tires: Others Value	Pneumatic Tubes: Automobile Number	Pneumatic Tubes: Automobile Value	Pneumatic Tubes: Others Value	Tire Repair Materials Value	Druggists' Rubber Sundries Value	Hard Rubber Goods: Battery Jars and Accessories Value	Hard Rubber Goods: Other Electrical Supplies Value	Hard Rubber Goods: Others Value	All Other Rubber Manufactures Value	Totals Value
.....	50	$913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$913
.....	653	7,694	.....	.....	.....	419	$686	.....	.....	.....	.....	.....	$122	$3,902	37,551
.....	1,557	19,450	$30	$642	.....	560	1,112	$50	$9	$1,300	.....	.....	.....	1,457	33,423
.....	109	1,618	.....	.....	.....	160	318	.....	.....	.....	.....	.....	.....	.....	1,936
.....	263	3,180	.....	318	.....	167	277	.....	37	.....	.....	.....	.....	316	10,514
.....	577	6,973	.....	.....	.....	70	498	.....	234	5,575	.....	$2,270	1,572	3,938	93,887
.....	35	807	.....	.....	.....	35	106	.....	.....	.....	.....	.....	.....	.....	3,122
.....	30	261	.....	.....	.....	60	100	.....	.....	.....	.....	.....	.....	.....	361
.....	338	3,964	36	561	$1,004	460	784	.....	72	.....	.....	.....	.....	.....	6,421
.....	6	141	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,971
.....	651	6,904	4,077	93	.....	20	45	705	.....	.....	.....	.....	.....	1,926	24,879
.....	.....	.....	.....	.....	.....	.....	.....	.....	140	.....	.....	.....	.....	.....	140
.....	.....	.....	73	.....	.....	.....	.....	12	132	.....	.....	.....	.....	.....	217
.....	75	718	.....	.....	.....	55	109	.....	.....	.....	.....	.....	.....	.....	827
.....	34	367	.....	.....	.....	44	58	.....	.....	.....	.....	.....	.....	90	541
.....	1,194	15,488	229	.....	56	946	1,681	111	111	61	.....	.....	.....	535	20,534
.....	2,324	32,620	3,047	3,409	175	2,254	3,588	562	569	.....	$50	.....	.....	590	53,525
.....	577	7,136	.....	1,016	.....	164	314	143	143	43	.....	.....	.....	579	10,204
.....	98	1,371	.....	.....	.....	138	281	.....	.....	.....	.....	.....	.....	.....	5,966
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	320	320
.....	792	11,505	37	2,479	.....	313	641	28	537	.....	600	.....	.....	1,112	30,841
.....	1,856	31,796	1,626	963	.....	585	1,246	105	.....	.....	.....	.....	.....	1,930	59,123
.....	130	1,967	285	.....	.....	65	94	9	.....	200	.....	.....	.....	78	6,619
.....	163	1,498	.....	.....	.....	98	140	.....	.....	.....	.....	.....	.....	.....	1,638
.....	23,141	227,101	120	32,402	.....	11,705	14,762	100	3,354	26,492	.....	.....	12,511	42,180	532,691
$898	107	2,159	.....	206	.....	134	318	.....	960	515	.....	.....	.....	1,297	16,006
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,520	.....	2,520
$898	34,760	$385.631	$9,560	$42,089	$1,235	18,452	$27,158	$1,825	$6,298	$34,186	$650	$2,270	$16,725	$60,250	$956,690
$162	70	$670	.....	.....	.....	94	$127	.....	$37	$59	$5,403	.....	$126	$1,403	$9,156
4,927	7,600	68,687	$72	$7,544	$909	2,661	2,893	$4	2,601	8,659	16,547	$4,749	11,114	47,056	265,731
1,628	272	3,396	81	436	.....	338	425	.....	40	2,287	291	32	663	7,648	19,630
438	34	604	5	.....	102	73	110	.....	.....	68	33	.....	162	1,768	9,437
.....	26	206	.....	.....	.....	5	12	.....	.....	2	.....	.....	.....	50	713
14	66	1,826	.....	.....	148	68	130	.....	.....	212	.....	.....	.....	163	4,268
.....	79	1,607	.....	137	.....	70	142	.....	.....	142	43	.....	.....	23	4,418
1,386	215	1,595	.....	.....	.....	.....	.....	.....	.....	188	.....	.....	120	57	5,641
268	10	166	.....	.....	.....	10	14	.....	.....	.....	.....	.....	1	63	2,910
133	2,372	16,417	205	2,589	416	1,278	2,281	57	201	255	270	.....	203	478	29,172
2	54	1,160	.....	388	.....	63	149	.....	291	193	.....	.....	.....	.....	9,516
1,844	7,786	92,217	1,025	2,374	1,276	8,437	12,717	194	2,332	2,322	426	370	454	12,810	202,567
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	484
1,653	.....	.....	.....	.....	.....	.....	.....	.....	.....	222	.....	303	.....	853	10,486
298	.....	.....	.....	.....	.....	7	22	.....	.....	159	.....	.....	10	345	1,433
.....	532	1,233	.....	.....	.....	88	123	.....	.....	.....	.....	.....	.....	68	1,943
34	329	4,602	60	1,040	.....	361	805	18	43	.....	.....	.....	.....	649	13,647
23	305	3,791	14	310	.....	295	599	.....	32	46	32	.....	.....	1,437	7,380
39	160	1,247	147	57	.....	175	275	.....	.....	105	.....	308	.....	317	12,710
5,143	8,312	76,364	824	6,075	.....	3,860	6,464	97	1,415	4,170	.....	74	230	10,204	193,538
92	386	4,184	32	801	.....	635	972	.....	518	153	.....	.....	15	818	12,786
.....	91	1,161	369	.....	71	142	240	40	36	50	.....	.....	.....	195	4,967
.....	121	1,170	.....	84	212	200	271	.....	41	.....	.....	.....	.....	.....	1,963
.....	166	1,770	.....	.....	553	264	467	10	25	.....	.....	.....	.....	211	3,651
12	35	413	.....	.....	.....	27	46	.....	.....	.....	.....	.....	.....	56	877
$18,096	29,021	$284,486	$2,834	$21,835	$3,687	19,151	$29,284	$420	$7,612	$19,292	$23,045	$5,836	$13,098	$86,672	$829,024
.....	12,997	$109,785	$15,764	$1,501	$2,595	17,395	$23,844	$107	$4,281	$2,610	.....	$345	.....	$6,864	$234,090
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$391	10	1,723
$82	6,802	60,512	.....	3,966	400	4,826	7,236	379	138	1,017	.....	.....	610	3,395	94,499
150	810	9,796	.....	.....	169	385	593	.....	242	58	.....	76	.....	785	20,197
37	410	5,296	.....	370	131	381	690	.....	50	924	.....	357	88	1,131	20,037
126	.....	.....	.....	.....	.....	.....	.....	.....	202	.....	.....	.....	.....	94	5,708
114	202	2,264	.....	330	67	87	145	.....	.....	.....	.....	.....	.....	89	5,954
.....	6	69	.....	.....	.....	16	27	.....	.....	.....	.....	.....	.....	.....	96
.....	.....	.....	.....	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48
.....	4	69	.....	.....	.....	4	9	.....	.....	92	.....	.....	.....	25	326
.....	825	13,917	240	3,358	.....	1,054	2,112	264	251	328	.....	7	334	1,900	32,521
.....	4,018	39,183	.....	.....	.....	955	1,452	.....	796	99	.....	.....	.....	934	46,906
44	801	11,968	163	54	.....	2,519	4,189	.....	189	186	.....	.....	.....	416	24,407
$553	26,875	$252,864	$16,167	$9,627	$3,362	27,622	$40,297	$750	$6,149	$5,314	.....	$785	$1,423	$15,643	$486,512
.....	987	$12,347	$339	$11,144	.....	461	$825	$170	$2,349	$97	.....	.....	.....	$951	$34,550
.....	6	192	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	960
.....	639	5,782	213	5,489	.....	471	623	5	.....	96	.....	.....	.....	61	13,374
.....	75	138	.....	.....	.....	75	226	.....	.....	.....	.....	.....	.....	.....	454
$37	579	8,845	5	847	.....	485	1,058	.....	432	1,351	.....	.....	.....	1,538	20,757
.....	255	2,480	.....	.....	.....	295	500	.....	.....	19	.....	.....	.....	.....	2,999
.....	511	6,932	352	7,158	$44	385	697	23	134	18	.....	$84	.....	392	21,321
.....	264	3,854	.....	.....	.....	30	42	.....	.....	.....	.....	.....	.....	70	6,065
.....	.....	.....	.....	.....	.....	.....	.....	.....	55	.....	.....	.....	.....	.....	55
.....	441	3,572	.....	.....	.....	250	321	.....	50	.....	.....	.....	.....	.....	3,943
80	100	1,700	.....	1,260	.....	30	60	.....	100	271	.....	.....	.....	444	4,856
147	548	7,859	20	4,025	.....	26	63	200	450	1,610	.....	.....	.....	2,885	50,508
.....	.....	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,483	1,506
.....	514	6,948	.....	325	.....	661	989	.....	66	.....	.....	.....	.....	1,258	10,070
.....	54	592	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	592
.....	70	667	.....	.....	.....	16	26	.....	.....	22	.....	.....	.....	.....	715
$264	5,043	$61,908	$952	$30,248	$44	3,185	$5,430	$398	$3,636	$3,484	.....	$84	.....	$9,682	$172,725

Exports of India Rubber Manufactures from the United

	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed and Auto Cloth and Auto Topping Value
OCEANIA													
Philippine Islands	$4,932	$5,158	$812	.....	.....	.....	.....	.....	45,146	$38,751	$10,428	$749	$167
Australia	10,223	737	2,117	.....	266	$1,030	.....	.....	6,256	4,619	.....	29,734	7,857
British Oceania	.....	.....	.....	.....	.....	.....	.....	.....	708	643	.....	.....	.....
French Oceania	.....	127	.....	.....	.....	.....	.....	.....	358	515	.....	.....	.....
New Zealand	2,960	3,240	1,397	.....	324	1,066	.....	.....	312	330	.....	66	.....
Other Oceania	.....	.....	.....	.....	.....	.....	.....	.....	218	284	.....	.....	85
TOTALS, OCEANIA	$18,115	$9,262	$4,326	.....	590	$2,096	.....	.....	52,998	$45,142	$10,428	$30,549	$8,109
AFRICA													
Belgian Kongo	$98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
British West Africa	.....	.....	.....	.....	4	$14	.....	.....	172	$215	.....	.....	.....
British South Africa	32,493	$15,679	$2,636	$66	24	50	.....	.....	1,475	1,941	$1,246	$6,515	$1,573
British East Africa	894	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	334	265
Canary Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Egypt	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,180	.....
Morocco	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portuguese East Africa	.....	5,694	1,226	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other Portuguese Africa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spanish Africa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	633
TOTALS, AFRICA	$33,522	$21,385	$3,862	$66	28	$64	.....	.....	1,647	$2,156	$1,246	$17,029	$2,471
GRAND TOTALS	$144,793	$111,058	$52,183	$132,977	15,879	$38,946	29,456	$25,241	273,756	$207,255	$79,096	$198,073	$91,121

United Kingdom Rubber Statistics

Imports

	Year ended December 31 1921 Pounds	1921 Value	1922 Pounds	1922 Value
UNMANUFACTURED				
Crude rubber				
From—				
Straits Settlements	50,683,700	£2,437,942	37,719,500	£1,598,923
Federated Malay States	58,069,000	2,872,887	50,242,400	2,302,447
British India	8,659,900	438,415	6,416,800	282,723
Ceylon and Dependencies	33,114,200	1,586,598	22,721,400	988,198
Other Dutch Possessions in Indian Seas	11,618,800	552,799	3,377,300	150,057
Dutch East Indies (except other Dutch Possessions in Indian Seas)	19,275,600	943,799	9,686,100	413,918
Other countries in East Indies and Pacific not elsewhere specified	2,583,600	124,148	1,931,000	81,087
Brazil	4,684,400	208,385	9,483,100	412,671
Peru	101,500	5,097	14,600	600
South and Central America (except Brazil and Peru)	153,800	7,424	501,000	20,474
West Africa:				
French West Africa	40,300	1,443	73,000	2,728
Gold Coast	77,300	4,100	9,000	307
Other parts of West Africa	235,900	10,963	315,700	11,929
East Africa (including Madagascar)	327,400	13,583	205,800	6,477
Other countries	685,300	31,503	385,500	13,974
Totals	190,310,700	£9,239,088	143,082,200	£6,286,513
Waste and reclaimed rubber	892,600	14,391	633,800	8,946
Gutta percha and balata	7,099,300	1,247,656	7,355,200	997,579
Rubber substitutes	130,000	3,836	88,600	2,529
Totals, unmanufactured	198,432,600	£10,504,971	151,159,800	£7,295,567
MANUFACTURED				
Boots and shoes..*dozen pairs*	62,600	£158,985	112,308	£237,924
Tires and tubes.....*number*	1,553,668	4,086,078	3,412,873	4,241,847
Other rubber manufactures	.....	674,674	.....	939,442
Totals, manufactured	.....	£4,919,737	.....	£5,419,213
Waterproof clothing..*number*	36,590	£14,732	6,803	£15,351
Insulated wire	.....	43,142	.....	126,622
Submarine cables	.....	.....	.....	.....

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	4,985,700	£103,901	4,038,000	£62,737
Rubber substitutes	597,500	16,259	1,091,200	28,062
Totals, unmanufactured	5,583,200	£120,160	5,129,200	£90,799
MANUFACTURED				
Boots and shoes..*dozen pairs*	104,609	£229,222	149,493	£269,883
Tires and tubes.....*number*	2,294,746	2,051,111	2,276,730	2,047,305
Other rubber manufactures	.....	2,372,330	.....	2,700,760
Totals, manufactured	.....	£4,652,663	.....	£5,017,948
Waterproof clothing..*number*	594,296	£951,649	879,695	£1,068,513
Insulated wire	.....	1,231,812	.....	756,126
Submarine cables	.....	2,146,264	.....	403,023

Exports—Colonial and Foreign

	Year ended December 31 1921 Pounds	1921 Value	1922 Pounds	1922 Value
UNMANUFACTURED				
Crude rubber				
To Russia	368,800	£12,668	6,898,500	£222,213
Sweden, Norway and Denmark	1,712,700	88,689	1,121,400	42,424
Germany	16,496,100	592,231	15,923,100	618,000
Belgium	2,557,700	103,181	2,406,800	92,958
France	18,074,200	747,630	28,976,800	1,152,756
Spain	378,200	18,378	861,200	34,992
Italy	2,919,900	119,324	5,547,900	213,269
Austria-Hungary	1,315,100	62,649	174,600	6,895
Other European countries	5,851,200	199,858	2,119,400	91,829
United States	45,930,900	1,998,700	50,424,300	2,021,331
Canada	308,000	12,864	2,817,000	100,984
Other countries	122,500	6,973	940,900	44,473
Totals	96,035,300	£3,963,145	118,211,900	£4,642,124
Waste and reclaimed rubber	39,900	991	59,700	1,379
Gutta percha and balata	611,600	101,338	912,300	120,525
Rubber substitutes	31,100	931	19,600	454
Totals, unmanufactured	96,717,900	£4,066,405	119,203,500	£4,764,482
MANUFACTURED				
Boots and shoes..*dozen pairs*	3,725	£13,282	4,925	£18,597
Tires and tubes.....*number*	164,887	448,362	135,570	282,957
Other rubber manufactures	.....	32,064	.....	45,146
Totals, manufactured	.....	£493,708	.....	£346,700
Waterproof clothing..*number*	618	£752	442	£231
Insulated wire	.....	381	.....	975
Submarine cables	.....	.....	....	.....

United Kingdom Rubber Imports and Exports

Imports

FROM	December 1922	December 1921	December 1920	Twelve Months Ended December 31 1922	Twelve Months Ended December 31 1921	Twelve Months Ended December 31 1920
Straits Settlements and Federated Malay States..*tons*	4,036	2,849	3,866	39,269	48,550	59,672
Ceylon and British India	1,136	1,441	2,245	13,009	18,649	26,912
Dutch East Indies, etc	311	698	1,511	6,694	14,950	12,940
Brazil and Peru	847	286	52	4,260	2,164	8,290
Other countries	114	70	97	642	678	3,064
Totals *tons*	6,444	5,344	7,771	63,874	84,991	110,878

Exports

TO						
United States *tons*	847	2,482	35	22,509	20,504	24,849
Canada	90	2	111	1,256	137	3,245
France	1,132	1,186	321	12,935	8,068	11,920
Belgium	49	45	88	1,077	1,142	2,163
Italy	200	56	121	2,477	1,304	2,689
Spain	30	10	24	384	170	229
Germany, Austria, Hungary	527	606	462	7,186	7,951	5,319
Russia	100	....	5	3,081	163	63
Sweden, Norway and Denmark	24	49	172	501	766	1,298
Other countries in Europe	48	99	119	946	2,613	1,080
Other countries	51	....	10	422	54	1,052
Totals *tons*	3,098	4,535	1,468	52,774	42,872	53,907

Compiled by the Rubber Trade Association of London.

States by Countries During December, 1922—*Continued*

	Pneumatic Casings			Solid Tires		Pneumatic Tubes			Hard Rubber Goods						
	Automobile			Automobile		Automobile					Druggists'	Battery			
Waterproofed Clothing Value	Number	Value	Others Value	Value	Others Value	Number	Value	Others Value	Tire Repair Materials Value	Rubber Sundries Value	Jars and Accessories Value	Other Electrical Supplies Value	Others Value	All Other Rubber Manufactures Value	Totals Value
.....	1,982	$26,045	$2,010	$9,743	$2,317	1,356	$2,417	$465	$640	$2,293	$66	.....	.....	$2,046	$109,039
$3,712	4,497	71,103	2,377	28,703	24	2,538	7,677	95	1,043	995	.....	.....	$1,181	2,713	175,940
15	1	32	.....	.....	.....	2	8	.....	.....	.....	.....	.....	.....	40	738
15	13	241	.....	116	94	14	35	.....	.....	.....	.....	.....	.....	.....	1,143
2,601	3,251	45,969	55	5,259	.....	1,894	3,733	353	1,615	412	.....	.....	.....	857	69,913
.....	50	497	.....	.....	.....	42	54	.....	.....	.....	.....	.....	.....	.....	920
$6,343	9,794	$143,887	$4,442	$43,821	$2,435	5,846	$13,924	$913	$3,298	$3,700	$66	.....	$1,181	$5,656	$357,693
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$98
.....	400	$7,317	$17	.....	.....	377	$1,141	.....	.....	.....	.....	.....	.....	$44	8,748
$3,479	3,079	35,982	134	$277	.....	3,238	5,096	.....	$252	$177	.....	.....	$17	3,180	110,793
.....	682	6,880	326	.....	.....	467	1,240	$51	20	.....	.....	.....	.....	327	10,349
600	66	668	.....	122	.....	120	128	.....	.....	.....	.....	.....	.....	.....	1,518
.....	739	8,203	117	.....	$1,540	500	778	10	35	.....	.....	.....	.....	.....	20,900
.....	46	455	.....	.....	.....	45	50	.....	.....	.....	.....	.....	.....	84	589
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	173	7,093
.....	208	2,702	.....	.....	.....	439	1,077	.....	.....	.....	.....	.....	.....	.....	3,779
.....	58	808	.....	3,031	.....	60	99	.....	.....	.....	.....	.....	.....	46	4,617
$4,079	5,278	$63,015	$594	$3,430	$1,540	5,246	$9,609	$61	$307	$177	.....	.....	$17	$3,854	$168,484
$30,233	110,771	$1,191,791	$34,549	$151,050	$12,303	79,502	$125,702	$4,367	$27,300	$66,153	$23,761	$8,975	$32,444	$181,757	$2,971,128

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

United Kingdom Rubber Statistics

Imports

	December, 1921		December, 1922	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber				
From—				
Straits Settlements	1,885,900	£84,836	6,348,300	£305,923
Federated Malay States	4,498,000	213,724	2,693,400	132,578
British India	219,900	10,610	564,900	27,957
Ceylon and Dependencies	3,008,400	138,785	1,980,600	93,099
Other Dutch Possessions in Indian Seas	732,700	36,430	195,900	9,590
Dutch East Indies (except other Dutch Possessions in Indian Seas)	634,200	29,671	411,500	18,969
Other countries in East Indies and Pacific, not elsewhere specified	186,700	8,975	89,700	4,692
Brazil	642,700	34,965	1,896,500	93,536
South and Central America (except Brazil and Peru)	.....	.....	63,100	2,365
West Africa				
French West Africa	.....	.....	51,300	1,983
Other parts of West Africa	7,100	384	87,700	3,590
East Africa, including Madagascar	6,700	170	42,100	1,149
Other countries	144,500	7,301	10,100	434
Totals	11,966,800	£565,851	14,435,100	£695,865
Waste and reclaimed rubber	12,500	£201	44,500	£489
Gutta percha and balata	1,588,200	264,744	882,500	112,844
Rubber substitutes	.....	.....	.....	.....
Totals, unmanufactured	13,567,500	£830,796	15,362,100	£809,198
MANUFACTURED				
Boots and shoes....*doz. pairs*	3,225	£11,253	8,033	£24,065
Tires and tubes.....*number*	182,107	331,174	276,597	220,410
Other rubber manufactures	.....	59,017	.....	71,629
Totals, manufactured	.....	£401,444	.....	£316,104
Waterproof clothing..*number*	25,808	£4,364	795	£608
Insulated wire	.....	2,745	.....	17,038
Submarine cables	.....	.....	.....	.....

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	642,000	£8,021	368,800	£4,775
Rubber substitutes	98,500	1,884	78,800	1,876
Totals, unmanufactured	740,500	£9,905	447,600	£6,651
MANUFACTURED				
Boots and shoes....*doz. pairs*	9,470	£21,031	13,046	£25,703
Tires and tubes.....*number*	122,810	140,656	151,951	131,690
Other rubber manufactures	.....	197,465	.....	218,481
Totals, manufactured	.....	£359,152	.....	£375,874
Waterproof clothing..*number*	45,721	£56,848	71,169	£74,739
Insulated	.....	61,611	.....	97,192
Submarine	.....	83,339	.....	63,596

Exports—Colonial and Foreign

	December, 1921		December, 1922	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber				
To Russia	.....	.....	224,100	£6,390
Sweden, Norway and Denmark	110,800	£4,736	53,700	2,965
Germany	1,323,500	50,946	1,180,100	53,857
Belgium	102,200	4,097	109,600	5,430
France	2,655,300	113,993	2,534,400	121,186
Spain	22,400	1,132	66,900	3,632
Italy	125,200	6,628	448,700	21,600
Austria	34,000	2,000	500	24
Other European countries	221,400	9,244	108,400	5,364
United States	5,559,400	221,649	1,896,200	92,839
Canada	4,900	220	202,100	6,205
Other countries	.....	.....	114,100	5,761
Totals	10,159,100	£414,645	6,938,800	£327,253
Waste and reclaimed rubber	.....	.....	12,400	155
Gutta percha and balata	40,400	6,114	53,400	6,489
Rubber substitutes	.....	.....	.....	.....
Totals, unmanufactured	10,199,500	£420,759	7,004,600	£333,897
MANUFACTURED				
Boots and shoes....*doz. pairs*	416	£1,364	241	£1,811
Tires and tubes.....*number*	11,020	43,606	4,992	9,386
Other rubber manufactures	.....	3,072	.....	1,622
Totals, manufactured	.....	£48,042	.....	£12,819
Waterproof clothing..*number*	.....	.....	240	£132
Insulated wire	.....	.....	.....	45
Submarine cables	.....	.....	.....	.....

Plantation Rubber Exports from Java and Madura

	November		Eleven Months Ended November 30	
	1921	1922	1921	1922
To Netherlands f. o.....*kilos*	111,000	99,000	5,000,000	3,012,000
Great Britain	246,000	361,000	7,054,000	4,298,000
Germany	123,000	95,000	603,000	1,156,000
France	.....	.....	.....	227,000
Other Europe	.....	12,000	104,000	202,000
United States	2,178,000	2,454,000	11,443,000	17,708,000
Singapore	245,000	191,000	2,619,000	2,354,000
Japan	13,000	4,000	281,000	131,000
Australia	.....	.....	211,000	93,000
Other countries	.....	.....	57,000	.....
Totals .....*kilos*	2,916,000	3,216,000	27,372,000	29,181,000
Ports of origin:				
Tandjong Priok .....*kilos*	1,448,000	1,814,000	12,132,000	12,928,000
Cheribon	.....	23,000	.....	57,000
Samarang	42,000	152,000	434,000	782,000
Soerabaya	1,345,000	1,098,000	12,698,000	13,618,000
Banjouwangi	.....	48,000	.....	480,000
Tjilatjap	42,000	4,000	1,048,000	629,000
Probolinggo	.....	33,000	.....	.....
Panaroukan	.....	14,000	.....	.....
Pasoerocan	.....	29,000	.....	.....

Rubber Statistics for the Dominion of Canada

Imports of Crude and Manufactured Rubber

	November, 1921		November, 1922	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free*				
Rubber, gutta percha, etc.				
From United Kingdom	98,430	$16,663	442,309	$71,916
United States	1,657,511	259,835	1,652,106	339,163
Belgium	.....	.....	66,476	7,696
Brazil	.....	7,514	.....	.....
British East Indies				
India	11,200	1,690	.....	.....
Straits Settlements	.....	63	179,281	25,099
Other countries	.....	.....	224	40
Totals	1,767,141	$285,765	2,340,396	$443,914
Rubber, recovered	176,711	$16,398	106,611	$9,545
Rubber, powdered, and rubber or gutta percha scrap	121,886	9,398	167,249	6,723
Balata	.....	.....	.....	.....
Rubber substitutes	51,075	5,277	71,510	7,709
Totals, unmanufactured	2,116,807	$317,838	2,685,766	$467,981
PARTLY MANUFACTURED				
Hard rubber sheets and rods	211	$456	3,438	$2,453
Hard rubber tubes	.....	1,032	.....	664
Rubber thread, not covered	6,852	8,727	9,810	11,310
Totalr, partly manufactured	7,063	$10,215	13,248	$14,427
MANUFACTURED				
Belting	.....	$5,485	.....	$13,854
Hose	.....	4,901	.....	7,994
Packing	.....	5,321	.....	4,023
Boots and shoes—*pairs*	.....	8,912	4,324	10,586
Clothing, including waterproofed	.....	15,124	.....	12,668
Gloves	.....	1,277	.....	1,758
Hot water bottles	.....	1,812	.....	3,427
Tires, solid	.....	11,096	.....	12,065
Tires, pneumatic	.....	19,337	.....	55,338
Inner tubes	.....	6,670	.....	3,560
Elastic, round or flat	.....	28,292	.....	29,465
Mats and matting	.....	440	.....	927
Cement	.....	2,075	.....	4,381
Other rubber manufactures	.....	77,132	.....	83,330
Totals, manufactured	.....	$187,874	.....	$242,376
Totals, rubber imports	2,123,870	$515,927	2,703,338	$724,784

Exports of Domestic and Foreign Rubber Goods

	November, 1921		November, 1922	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude and waste rubber	$3,506	$628	$8,893	$22,304
MANUFACTURED				
Belting	$1,515	.....	$18,485	.....
Canvas shoes with rubber soles	15,026	.....	39,103	.....
Boots and shoes—*pairs*	46,937	.....	50,139	.....
Clothing, including waterproofed	1,428	.....	240	.....
Hose	12,534	.....	6,429	.....
Tires, casings	.....	.....	353,915	.....
inner tubes	.....	.....	29,299	.....
pneumatic	223,163	.....	.....	.....
solid	12,434	.....	13,439	.....
vehicle	.....	$2,320	.....	$247
Other rubber manufactures	24,750	6,282	18,121	2,316
Totals, manufactured	$337,787	$8,602	$529,170	$2,563
Total, rubber exports	$341,293	$9,230	$538,068	$24,867

Imports of Crude Rubber into the United States by Customs Districts

	October, 1921		October, 1922	
	Pounds	Value	Pounds	Value
Massachusetts	249,510	$23,378	1,422,305	$179,836
Buffalo	3,825	174	.....	.....
New York	45,642,616	6,352,627	70,894,781	9,736,792
Maryland	559,977	168,861	448,000	66,756
Los Angeles	1,084,701	137,886	1,063,157	141,020
San Francisco	101,674	11,492	463,590	61,307
Oregon	.....	.....	23,350	3,390
Totals	47,642,303	$6,694,418	74,315,183	$10,189,101

The Market for Rubber Scrap

New York

The slowly strengthening scrap prices evident during the first three weeks of January were preliminary to some practical advances during February.

Full time production on the part of reclaimers following the rise in crude rubber prices has brought better business to the rubber scrap market. While showing improvement, prices are not yet in accord with scrap dealers' views nor has business gained the desired activity.

BOOTS AND SHOES. While not particularly active in demand, consumers are bidding for stock at fractionally higher prices since the first of February.

INNER TUBES. No. 1 tubes are advancing in price under much the same conditions as boots and shoes. No. 2 tubes are priced about one cent a pound under the No. 1 grades and are not quite as active.

MIXED TIRES. Early in the month this grade was disappointing both as to volume of business and price. Since that time there has been a slight improvement in both of these aspects.

MECHANICALS AND HOSE. Of the mechanical grades only hose is moving and that not actively, although the price has advanced slightly.

Quotations for Carload Lots Delivered

February 24, 1923

Prices subject to change without notice

Boots and Shoes		
Boots and shoes, black	*lb.*	$0.04½ @ $0.04⅝
Trimmed arctics	*lb.*	.03¼ @ .03½
Untrimmed arctics	*lb.*	.02¾ @ .03
Hard Rubber		
Battery jars, black compound	*lb.*	.01¾ @ .02
No. 1 scrap	*lb.*	.14 @ .15
Inner Tubes		
No. 1	*lb.*	.06¾ @ .07¾
Compounded red	*lb.*	.05½ @ .05¾
Mechanicals		
Black scrap, mixed	*lb.*	.01½ @
Heels	*lb.*	.02½ @ .03
Horse-shoe pads	*lb.*	.03 @ .03½
Hose, air brake	*lb.*	.01¼ @ .01½
regular	*lb.*	.01 @
Red, scrap, mixed	*lb.*	.07 @ .08
White scrap, mixed	*lb.*	.07 @ .07½
Tires		
Pneumatic		
Auto peelings	*lb.*	.02¼ @ .02½
Bicycle	*lb.*	.01 @ .01¼
Standard white auto	*lb.*	*.02¼ @ .02¾
Mixed auto	*lb.*	.01½ @ .01¼
Stripped, unguaranteed	*lb.*	*.01 @ .01½
Solid		
Carriage	*lb.*	.03¼ @ .03½
Irony	*lb.*	.075 @ .01
Truck, clean	*lb.*	.02½ @ .02¾

*Nominal.

BRITISH TIRE INDUSTRY RECUPERATING

The fact that France and the United States have by far the largest share in the world's tire export trade is apparently causing the English manufacturer much concern. One British writer admits that, due to the war and post-war conditions, foreign tires have been until recently superior to those produced in his own country. He believes, however, that with the present revival of the industry "the British tire of 1922-1923 is capable of holding its own under any conditions with any tire manufactured." He concludes his article with the advice that only English tires should be purchased by Englishmen and quotes figures which state that from January to December, 1922, the total import into England of foreign tires reached the approximate figure of 3,250,000, with a total value of over four million pounds.

"Rubber Machinery," by Henry C. Pearson, should be in the library of every rubber company.

The Market for Cotton and Other Fabrics

New York

AMERICAN COTTON. A month ago cotton reacted from 29 cents, the lowest quotation for the month being 27.4 cents on February 2. This figure was immediately succeeded by an irregular upward movement culminating at 28.9 cents on February 12, followed by an immediate drop to 28.0 cents on the following day and a steady upward recovery rising to 29.45 cents level on February 21.

From Washington comes a revised estimate of supply and consumption for the present season, which places the probable supply of American cotton, including the carryover from last year, at 15,087,000 bales and estimated world's consumption at 12,312,000, thus pointing to a carryover of only 2,775,000 bales at the end of this season, compared with 5,123,000 at the end of the previous season and 9,351,000 two years ago.

The Census Bureau report on supply and distribution for January indicated domestic consumption of 610,375 bales for the month, compared with 526,698 bales last year. This was the heaviest consumption reported for any January on record and the third largest for any one month in the history of the industry.

EGYPTIAN COTTON. Spot prices a month ago were as follows: Sakellaridis 37⅜ cents; Medium Uppers 34 cents. The following week these grades were quoted respectively at 36½ and 32⅞ cents. In the third week there was an advance in sympathy with American futures with notable narrowing margin between Sakellaridis and Medium Uppers to 2½ cents, Sakels being quoted at 36⅞ and Medium Uppers at 34¼ cents. In the succeeding week the prices declined slightly on the respective grades to 35⅞ and 34⅛ cents. On February 16 staple cottons were reported moving slowly and the price holding on very even levels.

ARIZONA COTTON. The prices of No. 1 and 2 grades of Pima for the first three weeks of the month were steady at 38 and 37 cents, respectively, and in the last week the same grades advanced to 38½ and 37½ cents. Owners of cotton the world over are beginning to watch the 1923 crop prospects and discuss acreage, which undoubtedly will increase not only in America but in Egypt and other cotton producing countries.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The market during the past month has maintained the marked increase of activity noted a month ago, the only change in condition being that prices have further advanced under renewed demand for fabrics by large consumers. Consumers whose needs are not already provided for are certain to pay increased prices.

RAINCOAT FABRICS. Business in raincoat fabrics has been quite active in recent weeks. Prices are tending strongly upward. Consumers are buying conservatively, covering their requirements only from one to two months in advance, evidently regarding a drop in prices not impossible. The volume of business has been small and orders are for spot and nearby shipment.

SHEETINGS. Business in sheetings has been very active the past month, notwithstanding the rising prices. The large consumers' needs are now fairly well covered for the spring months. It is questionable how much higher prices will range. The market has been firm with advancing price tendency. Most mills are sold up to May.

TIRE FABRICS. Trade in tire fabrics has been brisk since the turn of the year, at advanced prices. Most tire manufacturers have already provided for their fabric requirements till June. Many are contemplating contracting for supplies to cover the entire balance but are deterred owing to the high prices demanded for futures.

New York Quotations

February 24, 1923

Prices subject to change without notice

Burlaps			
40—7-ounce	100 yds.		
40—7¼-ounce		$7.35 @	$7.40
36—8-ounce			
40—8-ounce		7.40 @	7.50
40—10-ounce		8.95 @	9.00
40—10½-ounce		9.00 @	9.10
Drills			
38-inch 2.00-yard	yard	.25 @	
40-inch 3.47-yard		.15 @	
52-inch 1.90-yard		.27⅛ @	
60-inch 1.52-yard		.34⅞ @	
Duck			
CARRIAGE CLOTH			
38-inch 2.00-yard	yard	.26½ @	
40-inch 1.47-yard		.35½ @	
72-inch 16.66 ounce		.62½ @	
72-inch 17.21-ounce		.62½ @	
MECHANICAL			
Hose	pound	.49 @	
Belting		.48 @	
Osnaburgs			
40-inch 2.35-yard	yard	.16⅛ @	
40-inch 2.48-yard		.21⅜ @	
40-inch 3.00-yard		.17½ @	
37½-inch 2.42-yard		.21¾ @	
Tennis			
51-inch 1.35-yard	yard	.40⅞ @	
Hollands			
DEAD FINISH			
Standard, 37-inch, white and colors	yard	.20 @	
42-inch, white and colors		.24 @	
FLAT FINISH			
Imperial, 36-inch, white and colors		.16 @	
40-inch, white and colors		.18 @	
Raincoat Fabrics			
COTTON			
Bombazine 64 x 60	yard	.15 @	
60 x 48		.13 @	
Cashmeres, cotton and wool, 36-inch, tan		.29 @	
Plaids 60 x 48		.14½ @	
56 x 44		.13¾ @	
Surface prints 60 x 48		.15¼ @	
64 x 60		.16¼ @	
Sheetings, 40-inch			
48 x 48, 2.50-yard	yard	.20 @	.20½
48 x 48, 2.85-yard		.17⅜ @	
64 x 68, 3.15-yard		.16½ @	.17
56 x 60, 3.60-yard		.14½ @	.14¾
48 x 44, 3.75-yard		.14 @	
44 x 44, 5.50-yard		.10½ @	
Sheetings, 36-inch			
48 x 48, 5.00-yard	yard	.10 @	
40 x 40, 6.00-yard		.08⅝ @	
44 x 40, 6.00-yard		.08½ @	
Silks			
Canton, 38-inch	yard	.35 @	
Schappe, 35-inch		.47½ @	
Tire Fabrics			
BUILDING			
17¼-ounce Sakellaridis, combed	pound	.85 @	
17¼-ounce Egyptian, combed		.73 @	
17¼-ounce Egyptian, carded		.67 @	
17¼-ounce Peeler, combed		@	
17¼-ounce Peeler, carded		.62 @	.65
CORD			
15-ounce Egyptian, combed	pound	.76 @	
15-ounce Egyptian, carded		.70 @	
2½-pick Peeler, carded		.65 @	
BICYCLE			
8-ounce American	pound	@	
10-ounce American		@	
BREAKER			
Leno, Peeler, carded		.65 @	
CHAFER			
9¼-ounce Egyptian, carded	pound	.75 @	
9¼-ounce Peeler, carded		.73 @	

Supply and Consumption of Cotton

The third world cotton summary of the Department of Commerce shows that on July 31, 1922, the world stock of American cotton was 5,123,000 bales and world stocks of all kinds of cotton (including American) were 9,536,000 bales.

Adding this season's production of 9,964,000 bales of American cotton and 17,664,000 bales of all kinds, gives a total supply for the season 1922-23 of 15,087,000 bales of American and 27,200,000 bales of all kinds. This is less by about 2¼ million bales of American and the same amount of all kinds of cotton than the supply for 1921-22. From this total supply subtract the estimated consumption for the year 1922-23 of 12,312,000 bales of American and 20,579,000 of all kinds of cotton and the indicated carry over on next August 1, 1923, is only two and three-fourths million bales of American and six and one-half million of all kinds. That is, the stocks of American cotton will have diminished over six and one-half million bales and stocks of all kinds over 8,000,000 bales within only two years, and will have reached an abnormally low total.

Cotton manufacturing showed greater activity during January than at any time in the history of the industry. The number of cotton spindles active during the month passed the 35,000,000 mark for the first time, the Census Bureau's monthly report, issued last month, showing the number of active spindles to have been 35,240,853.

Consumption during January totaled 610,375 bales, which has been exceeded only twice heretofore, in March, 1916, when 613,754 bales were consumed, and in May, 1917, when 615,412 bales were used.

The growth of the cotton spinning industry in cotton-growing states is largely responsible for the increased activity. In January cotton-growing states consumed more cotton than in any month in their history and the number of active spindles was larger than ever before.

Active spindles for the whole country increased from 30,359,843, in January, 1913, to 35,240,853, in January this year, while in the cotton-growing states the number increased from 11,740,465 to 15,966,294. Consumption of cotton in the same period increased from 533,743 bales to 610,375, the cotton-growing states' consumption increasing from 271,504 bales to 384,019.

RUBBER IMPORTANT IN FOREIGN TRADE

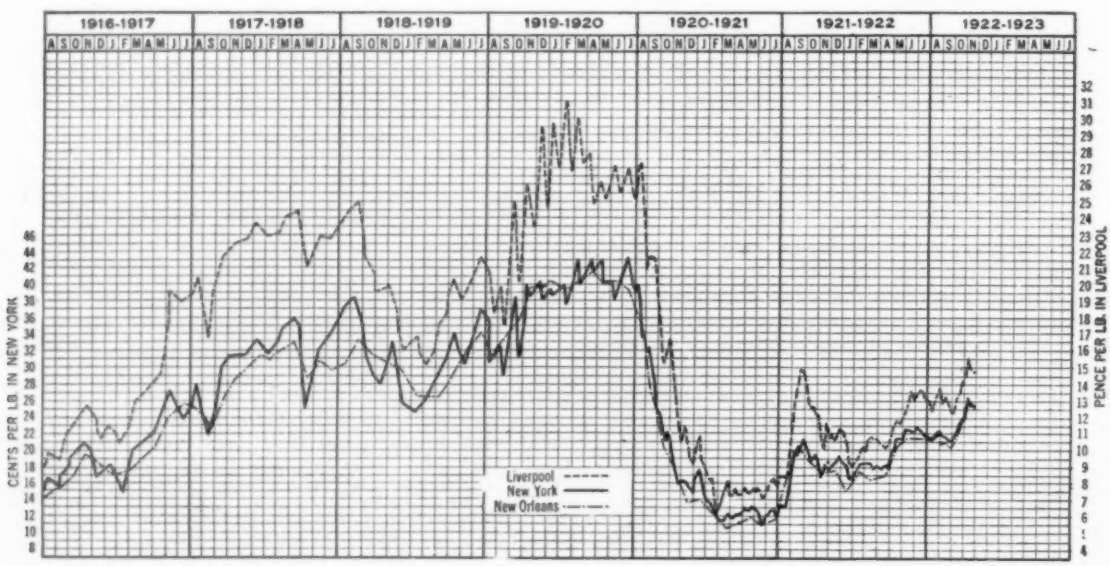
A bulletin recently issued by the Bureau of Foreign and Domestic Commerce, Washington, D. C., and entitled "Our World Trade, January-September, 1922," sets forth in its statistics the important position that rubber and rubber manufactures hold in American industry. For example, among this country's ten leading imports during the period under consideration, and constituting 44 per cent of the whole, crude rubber held the fourth place, with a value of $72,405,000. Also in a quantity comparison for these nine months of 91 chief imports, crude rubber ranked as eighteenth, at 470,587,000 pounds. For the corresponding period in the year previous the amount imported was only 257,255,000 pounds, a gain for 1922 of 82.9 per cent.

In the consideration of our export trade for these nine months of 1922, automobile tires are mentioned as valued at $15,161,000, and ranking as twenty-seventh out of fifty leading commodities. This figure represents an increase of 33 per cent over the nine months' period of the year previous. This one item is of particular interest as the total exports from the United States of all commodities showed at this time a decline of 23 per cent, and automobile tires are conspicuously mentioned among goods showing substantial export increases.

A. S. T. M. ANNUAL MEETING

The American Society for Testing Materials, 1315 Spruce street, Philadelphia, Pennsylvania, will hold its twenty-sixth annual meeting at the Chalfonte-Haddon Hall, Atlantic City, New Jersey, during the week of June 25, 1923. Plans for the occasion are now being made, and many interesting papers will be presented. It is noted that among the subjects to be discussed will be the abrasion of rubber compounds.

Various committee meetings have been scheduled for the intervening months, that of Committee D-11 on Rubber Products, to be held in New York, N. Y., on March 30. The preparation of a new specification for cold water hose is to be considered by this body. At the November meeting consideration was given to a number of revisions of the present tentative specifications for hose and belting. At that time the appointment of a new sub-committee on performance tests was also authorized.



Shepperson Publishing Co.

Course of the New York, New Orleans and Liverpool Spot Cotton Market

The Market for Chemicals and Compounding Ingredients

New York

PRACTICALLY full time production in all divisions of the rubber manufacturing industry is evidenced in the uniformly active demand for every line of compounding ingredient and the reported outlook for still further increase in volume of business for the spring months.

The general complaint of inadequate rail transportation facilities throughout the country marks the greatest drawback to the progress of industry generally toward free and rapid development. This condition is subject to correction only gradually, unfortunately, and shows improvement from month to month.

ANILINE. The demand for aniline has increased during the past month and prices have assumed a firm tone.

BARYTES. Poor railroad transportation service greatly hinders the free movement of barytes from the mines. Prices remain unchanged.

BENZOL. There has been no change in quotation. The market is reported satisfactory with supplies increasing. There is no export trading.

BLANC FIXE. Blanc fixe being produced from barytes suffers under the limitation of poor rail facilities hampering trade in that material. Prices continue steady, however.

CARBON BLACK. Trade in carbon black continues just as active as ever. The transportation situation at points of production has been improved by additional car supply. Notwithstanding the liberal increase in production facilities the demand for carbon black will doubtless keep pace with the output. Carbon black is recognized in the rubber trade as an essential to wearing quality in tire treads.

CHINA CLAY. China clay is well established as a standard compounding ingredient in practically all of the heavy lines of rubber goods production such as tires, heels, mechanicals, etc. The demand is thus very steady and large in volume. Prices continue on a firm low basis. Stock movement is still seriously delayed by inadequate railroad facilities and water transportation has become important as a factor in getting goods to the consumer.

DRY COLORS. Business in all lines of dry colors is reported good.

LITHARGE. Requirements of the rubber trade for litharge have reached a good volume. There was an advance in lead products of ½ cent a pound the latter part of January, which did not reduce the volume of consumers demand.

LITHOPONE. Production is well sold ahead for two months on established quotations. Production is at full capacity and far short of meeting the demand as anticipated for spring. Prices have not been advanced. There are no importations.

SUBLIMED LEAD. Practically the same conditions rule as in the case of litharge—with the same recent advance of ½ cent a pound. Consumption is steady and seasonal and tends to increase as spring approaches.

SULPHUR. Steady seasonal demand characterizes this staple basic ingredient with no change in price noted.

TALC. The movement to the consuming trade has been steady and seasonal. Both foreign and domestic are sharing the market as usual.

SOLVENT NAPHTHA. The market is in a sold-up state due to excess of demand over supply.

WHITING. The market continues without change as to steady demand and price. Goods are moving into consumption in good volume.

ZINC OXIDE. No price changes are expected for a long time to come. The last one was made the last day of last year. The makers report full production with active buying on the part of the tire makers and rubber trade generally.

New York Quotations

February 24, 1923

Prices subject to new tariff revision

Accelerators, Organic

Accelerene (f. o. b. English port)	lb.	13s.	@
Accelemal	lb.	$0.35	@
Aldehyde ammonia crystals	lb.	.93	@
Aniline (f. o. b.) factory	lb.	.16½	@ .18
Diphenylguanidine	lb.	1.25	@ 1.60
Ethylidene aniline	lb.	.85	@ 1.00
Excellerex	lb.	.40	@ .45
Formaldehyde aniline	lb.	.51½	@
H. R.	lb.		@
Hexamethylene tetramine	lb.	.95	@ .97½
Lead oleate (bbls.)	lb.	.18	@
Methylene aniline	lb.	.40	@ .50
Methylene paratoluidine	lb.	1.40	@
N. C. C.	lb.		@
No. 500 Rubber	lb.		@
No. 801 Rubber	lb.		@
No. 999	lb.	.16	@
Paradin	lb.	.38	@
Paraldehyde	lb.	.17	@ .19
Paranitrose-djmethylaniline Base	lb.	1.30	@
Paraphenylene diamine	lb.	1.50	@ 1.55
Super-sulphur, No. 1	lb.	.50	@ .60
No. 2	lb.	.25	@ .30
Super-X	lb.	.40	@
Super-XX	lb.		@
Tetramethylthiuramdisulphide	lb.	6.00	@
Thiocarbanilide	lb.	.28	@ .35
Vul-Ko-Cene	lb.	.35	@
XLO	lb.		@

Accelerators, Inorganic

Lead, red	lb.	.11	@
sublimed blue	lb.	.09	@
sublimed white	lb.	.09	@
Lime, flour, superfine	lb.	.02	@ .02½
Litharge, domestic	lb.	*.08½	@ .11½
imported	lb.	*.17	@
Magnesia, carbonate, light	lb.	.08	@ .09
calcined, light (bbls.)	lb.	.23	@ .24
calcined, ex. light (bbls.)	lb.	.45	@
calcined, md. light (bbls.)	lb.	.13	@
calcined, heavy (bbls.)	lb.	.05	@
oxide, heavy	lb.	.05	@ .06
Orange mineral A. A. A.	lb.	.14	@

*Nominal.

Acids

Acetic 28% (bbls.)	cwt.	$3.17½	@$3.92½
glacial, 99%	cwt.	12.05	@12.85
Cresylic (97% straw color)	gal.	1.35	@ 1.50
(95 dark)	gal.	.75	@ .85
Sulphuric, 66 degrees	ton	14.00	@16.00

Alkalies

Caustic soda	lb.	.02½	@

Colors

BLACK

Bone, powdered	lb.	0.05½	@ 0.07½
Carbon black	lb.	.18	@ .24
pressed	lb.	.19	@ .25
Dipped goods	lb.		@
Drop	lb.	.07½	@ .16
Gritless black	lb.	.40	@
Hyposulphite of lead	lb.		@
Ivory black	lb.	.15	@ .45
Lampblack	lb.	.12	@ .40
Micronex	lb.		@

BLUE

Cobalt	lb.	.21	@ .26
Dipped goods	lb.		@
Gritless blue	lb.	3.50	@
Prussian	lb.	.55	@ .60
Ultramarine	lb.	.10	@ .35

BROWN

Iron Oxide	lb.	.04	@ .04¾
Sienna, Italian	lb.	.05	@ .07
Umber, Turkey	lb.	.06	@ .07
Vandyke	lb.	.05½	@ .06½

GREEN

Chrome, light	lb.	.32	@ .34
medium	lb.	$ .32	@$ .34
dark	lb.	.36	@ .45
commercial	lb.	.12	@
tile	lb.	.11	@ .13
Dipped goods	lb.		@
Gritless green	lb.	3.50	@
Guignet	lb.		@
Oxide of chromium	lb.	.55	@ .67

RED

Antimony, crimson, T. K.	lb.	.48	@
crimson, 15/17% free	lb.	.35	@ .42
crimson, R.M.P. No. 3	lb.	.50	@
crimson F	lb.	.35	@
Antimony, golden, T. K.	lb.	.22	@
golden R.M.P. No. 7	lb.	.21	@
golden, 15/17% free	lb.	.18	@ .22
golden, No. 1	lb.	.30	@
golden, No. 2	lb.	.20	@
7-A	lb.	.35	@
vermilion, T. K.	lb.		@
vermilion 15/17% F. S.	lb.	.50	@
vermilion 5% F. S.	lb.	.60	@
red sulphuret	lb.	.20	@
Arsenic sulphide, red	lb	.15½	@
lemon	lb.		@
orange	lb.		@
Cadmium sulphide, red	lb.	2.00	@
Dipped goods red	lb.		@
purple	lb.		@
orange	lb.		@
Gritless red (four shades)	lb.	3.50	@
purple	lb.	2.50	@
Indian	lb.	.08	@ .12
Indian maroon, English	lb.	.12	@ .15
Iron oxide, reduced	lb.	.12	@
pure bright	lb.	.14	@
Maroon oxide	lb.	.08	@ .12
Red oxide, crimson	lb.	.06	@
English	lb.	.12	@
Spanish	lb.	.04½	@
Oximony	lb.	.16	@
Para toner	lb.		@
Spanish natural	lb.	.03½	@ .04½
Toluidine toner	lb.	2.00	@ 2.10
Venetian	lb.	.03½	@ .06
Vermilion, American	lb.	.25	@ .30
English quicksilver	lb.	1.35	@ 1.40

Colors—*Continued*

WHITE

Albalith	lb.	$0.06½ @	$0.07
Aluminum bronze	lb.	.55 @	.60
Lithopone, domestic	lb.	.06½ @	.07
Red Seal, imported	lb.	.08 @	.08½
Zinc oxide:			
American Horse Head			
Special	lb.	.08 @	.08½
XX red	lb.	.07½ @	.08
French process, Florence			
Green seal	lb.	$0.10¼ @	$0.10¼
Red Seal	lb.	.09¼ @	.09¾
White seal	lb.	.11½ @	.11¾
Azo (factory):			
ZZZ (lead free)	lb.	.07½ @	.08
ZZ (—5% leaded)	lb.	.06¾ @	.07¼
Z (8.10% leaded)	lb.	.06½ @	.07
Zinc sulphide	lb.	@	

YELLOW

Arsenic, yellow	lb.	.85 @	
Cadmium, sulphide, light	lb.	2.00 @	
Chrome, light and med.	lb.	.18 @	.19
Dipped goods	lb.	@	
Gritless yellow	lb.	3.50 @	
India rubber	lb.	.87½ @	
Ochre, domestic	lb.	.02 @	.02¾
imported	lb.	.03 @	.03½

Compounding Ingredients

Aluminum flake (carloads)	ton	25.00 @	29.00
hydrate, light	lb.	.18 @	.20
Ammonia carbonate	lb.	.07¾ @	.10½
Asbestine	ton	20.00 @	25.00
Aluminum silicate	ton	22.00 @	25.00
Barium, carbonate, precip.	ton	70.00 @	72.50
dust	ton	100.00 @	
Barytes, pure white C. L.	ton	23.90 @	
off color (carloads)	ton	20.00 @	
uniform floated (carloads)	ton	23.90 @	
Basofor	lb.	.04¾ @	
Blanc fixe	lb.	.04¼ @	.04½
Carrara filler (factory)	lb.	.01¾ @	
Chalk, precip. extra light	lb.	.03½ @	.04¼
heavy (f.o.b. factory)	lb.	.02½ @	.03¼
China clay, Dixie	ton	22.00 @	32.00
Blue ribbon (carloads)	ton	14.00 @	
Blue Ridge	ton	20.00 @	30.00
Cotton flock, black	lb.	.12 @	
light-colored	lb.	.12 @	.14
white	lb.	.15½ @	.21
Cotton linters clean mill-run	lb.	.06¾ @	
Fossil flour (powdered)	ton	60.00 @	
(bolted)	ton	60.00 @	
Glue, high grade	lb.	.30 @	.40
medium	lb.	.20 @	.26
low grade	lb.	.16 @	.19
Graphite, flake	lb.	.05 @	
amorphous	lb.	.05 @	
Infusorial earth (powd.)	ton	60.00 @	
(bolted)	ton	65.00 @	
Mica, powdered	lb.	*.15 @	
Pumice stone, powdered	lb.	.03 @	.03
Rotten st., powd. (bbls.)	lb.	.02½ @	04½
Silica, gold bond (factory)	ton	31.00 @	
silver bond (factory)	ton	25.00 @	
Soap bark, cut	lb.	.08 @	
Soapstone, powdered, gray	ton	12.00 @	
Sodium bicarbonate (bbls.)	lb.	.02½ @	
Starch, powd. corn (bags)	cwt.	2.82 @	2.92
(bbls.)	cwt.	3.10 @	3.20

*Nominal.

Chemical Market—*Continued*

New York Quotations

February 24, 1923

Prices subject to new tariff revision

Talc, soapstone	ton	$15.00 @	$20.00
Terra blanche	ton	22.50 @	26.00
Tripoli flour, cream or rose	ton	@	
white (factory)	ton	@	
Tyre-lith	ton	75.00 @	77.00
Whiting, Alba	cwt.	@	
chalk	ton	@	
commercial	cwt.	1.00 @	
Danish (factory)	ton	16.00 @	
English cliffstone	cwt.	1.50 @	
gilders (bolted)	cwt.	1.10 @	
K. T.	ton	@	
Paris, white, American	ton	20.00 @	
Perfection (carloads)	ton	22.00 @	25.00
Plymouth	ton	@	
Quaker	ton	13.00 @	15.00
Superfine	ton	@	
Wood pulp, XXX	ton	35.00 @	
X (f.o.b. factory)	ton	25.00 @	

Mineral Rubber

Gilsonite	ton	65.00 @	
Genasco (factory)	ton	55.00 @	57.00
Hard hydrocarbon	ton	33.00 @	42.00
Liquid rubber	lb.	.15 @	
Soft hydrocarbon	ton	32.50 @	38.00
320/340 M. P. hydrocarbon	ton	45.00 @	50.00
300/310 M. P. hydrocarbon	ton	40.00 @	45.00
Pioneer, M. R., solid (fac.)	ton	42.00 @	44.00
M. R. granular	ton	52.00 @	54.00
Robertson, M. R., solid	ton	40.00 @	85.00
M. R. granular (factory)	ton	55.00 @	95.00
Rubrax (factory)	ton	60.00 @	
States "A"	ton	@	
No. 1	ton	@	
Synpro, gran. M. R. (fac.)	ton	55.00 @	70.00

Oils

Avoilas compound	lb.	.14 @	
Castor, No. 1, U. S. P.	lb.	.13½ @	
No. 3, U. S. P.	lb.	.13 @	
Corn	lb.	.12 @	
Cotton	lb.	@	
Glycerine	lb.	.18¾ @	.19
Halowax (500-lb. drums)	lb.	@	
Linseed, raw	gal.	.96 @	
Palm lagos	lb.	.08 @	.08¼
Palm, niger	lb.	.08 @	
Peanut	lb.	.14½ @	
Petrolatum, standard	lb.	.05 @	.08
Petrolatum, sticky	lb.	.08 @	.10
Pine, steam distilled	gal.	.75 @	.78
Rapeseed, refined	gal.	.83 @	
blown	gal.	.96 @	
Rosin	gal.	.42 @	.50
Synpro	gal.	@	
Soya bean	lb.	.13 @	
Tar	gal.	.28 @	

Resins and Pitches

Cumar resin hard	lb.	@	
soft	lb.	@	
Tar, pine, retort	bbl.	$12.00 @	
kiln	bbl.	13.00 @	14.00
Pitch, Burgandy	lb.	.05 @	
coal tar	lb.	.01¼ @	
Fluxol hardwood	ton	40.00 @	60.00
pine tar	lb.	.03 @	
ponto	lb.	.07 @	
Rosin, K (bbl.)	280 lbs.	6.75 @	
strained (bbls.)	280 lbs.	6.55 @	
Shellac, fine orange	lb.	*.90 @	

Solvents

Acetone (98.99% drums [6.62 lbs. per gal.])	lb.	@	
Benzol (90%, drums [7.21 lbs. per gal.])	gal.	@	
pure (drums)	gal.	.42 @	
Carbon bisulphide (dms. [10.81 lbs. per gal.])	lb.	.06¾ @	.07
tetrachloride (drums. [13.28 lbs. per gal.])	lb.	.10 @	.10½
Motor gasoline (steel bbls.)	gal.	.23 @	
Naphtha, V. M. & P.	gal.	.22 @	
solvent (drums extra)	gal.	.25 @	
Cymene (factory)	lb.	@	
Toluol, pure (7.21 lbs. per gal.)	gal.	@	
Turpentine, spirits	gal.	1.49 @	
wood, steam distilled	gal.	1.40 @	

Substitutes

Black	lb.	.08 @	.13½
Brown	lb.	.09 @	.15
White	lb.	.09 @	.16½
Brown factice	lb.	.08¼ @	.15
White factice	lb.	.09 @	.15

Vulcanizing Ingredients

Black hypo, T. K., S. F.	lb.	.22 @	
13%	lb.	.22 @	
Sulphur chloride (drums)	lb.	.08 @	
(jugs)	lb.	.13½ @	
Sulphur, Bergenport brand, 100% pure (bbls.)	cwt.	2.55 @	2.90
(bags)	cwt.	2.30 @	2.65
Sulphur flour (bbls.)	cwt.	@	
(bags)	cwt.	@	
Superfine 100% pure	cwt.	@	

(See also Colors—Antimony)

Waxes

Wax, beeswax, white, com.	lb.	.45 @	
ceresine, white	lb.	.12 @	
carnauba	lb.	.20 @	
montan	lb.	.04 @	.04½
ozokerite, black	lb.	.18 @	
green	lb.	.27 @	
paraffine	lb.	.02¾ @	.04¾
sweet wax	lb.	.10 @	.12

Miscellaneous

Saturating material	lb.	@	
Finishing material	lb.	@	
Insulating compound	lb.	.05 @	.07
Battery sealing compound	lb.	.03 @	.05

PARAVAR VARNISH

A new hard rubber that meets the need of those requiring a thoroughly moisture and acid proof paint or varnish has been perfected and is now in production. It is known as Paravar and is a light amber colored liquid rubber that spreads readily with a brush and by its self-vulcanizing property forms a hard protective coating wherever applied. It is proving very satisfactory for moisture proofing concrete, stucco, brick work, etc. It is also moisture and acid proof for wood, metal, and other equipment.—United States Rubber Co., 1790 Broadway, New York, N. Y.

REPORT OF UNDERWRITERS' LABORATORIES

In reviewing its work of the past year the Underwriters' Laboratories, 207 East Ohio street, Chicago, Illinois, reports the following investigations: Special studies regarding fire hose; inspection work in rubber-covered wire factories; cooperation with The American Society for Testing Materials (rubber products and rubber materials), and The American Engineering Standards Committee (rubber-covered wire, and accelerated aging tests of rubber). In addition a standard rubber-sheathed cord known as type SJ cord has been developed for use on portables in radio work.

BACKING PAPER FOR SHEET GOODS

A specially non-adhesive, smooth-coated tough paper has been found a very effective and economical substitute for holland cloth in which to wrap roll strip. This paper comes in various widths and weights adapted as a liner upon which to roll insulation tape, stamp gum, dental rubber, repair or patching stock.—C. H. Bruns & Co., 111 West Washington street, Chicago, Illinois.

RUBBER DIVISION AMERICAN CHEMICAL SOCIETY

The next meeting of the Rubber Division of The American Chemical Society, will be held in New Haven, Connecticut, April 3-7. An interesting program is being planned.

Foreign Tariffs

British Guiana

According to an ordinance which became effective August 31, 1922, increased surtaxes, with certain exceptions, have been levied on all goods imported into British Guiana. Among commodities which are exempt from these duties are balata, rubber and similar products exported from Venezuela. The surtaxes apply upon general and British preferential duties alike.

Canada

With the exception of a preferential rate of 25 per cent ad valorem granted to France, the Netherlands, and Belgium in connection with certain rubber manufactured goods, the rubber manufactures of France, Austria, Germany, and Italy, together with those from the United States, are dutiable under general rates, as given below. All goods originating in the British Empire, with the exception of Australia, are admitted under the British preferential rates as shown in the second column.

The normal value of the Canadian dollar is $1.00, actual rate of exchange variable.

Tariff No.	Articles	Rate of Duty: General Ad Valorem	Rate of Duty: Preferential Ad Valorem
562	Oiled silk, and oil cloth, and tape or other textile, rubbered, flocked or coated, not specified	30%	20%
569	Stockinettes for the manufacture of rubber boots and shoes, when imported by manufacturers of rubber boots and shoes, for use exclusively in the manufacture of such articles in their own factories	15%	10%
ex592	Tires of rubber for vehicles of all kinds, fitted or not	35%	22½%
616	Rubber and gutta percha, crude, caoutchouc or india rubber, unmanufactured; powdered rubber and rubber or gutta percha waste or junk; hard rubber in sheets but not further manufactured, and recovered rubber and rubber substitute	Free	Free
616a	Balata, crude, unmanufactured	Free	Free
617	India rubber boots and shoes	25%	15%
618	Rubber cement and all manufactures of india rubber and gutta percha not specified	27½%	15%
619	India rubber clothing and clothing made waterproof with india rubber; rubber or gutta percha hose, and cotton or linen hose lined with rubber; rubber mats or matting and rubber packing	35%	20%
ex673	Rubber heads, for whips, when imported by whip manufacturers for use in their own factories	Free	Free
ex676	Rubber bulbs, when imported by manufacturers of vaccine points for use in their factories	Free	Free
570	Mats, door or carriage, other than of metal, not specified	35%	25%
	Rate for France	30%	..
683	Fillets of cotton and rubber not exceeding 7 inches wide, when imported by manufacturers of card clothing for use exclusively in the manufacture of card clothing in their own factories	Free	Free
684	Rubber thread not covered	Free	Free
742	Hard rubber, unfinished in tubes for use only in the manufacture of fountain pens, when imported by manufacturers of such pens	10%	5%
ex747	Gutta percha and imitation rubber, when imported by manufacturers of music rolls for piano players for use only in the manufacture of such music rolls in their own factories	Free	Free
755	Hard rubber in strips or rods, but not further manufactured, when for use in Canadian manufactures	Free	Free
ex771	Articles of hard rubber when imported by manufacturers for use only in their own factories in the manufacture of electric storage batteries	20%	12½%

Germany

An increase of 50 per cent in the import duties on the following articles classed as luxuries became effective in Germany on September 28:

574, secs. 1, 3—India rubber tubing for tires of wheels of vehicles; other kinds of india rubber tubing with an underlayer of vegetable textile material impregnated or coated with india rubber or with an internal layer of india rubber; tubing of india rubber with textile material wound round or plaited thereon; all these, whether combined or not with common metals or alloys of common metals.

578—India rubber tires for wheels of vehicles; also tire covers of textile materials impregnated or coated with india rubber or with an internal layer of india rubber.

Spain—United Kingdom

A continuation of a most-favored-nation status, applicable also to the United States, is indicated by the signing on November 1, at Madrid, of a commercial treaty between Spain and the United Kingdom. Among the various reductions in duties the following are noted:

1498—Solid tires for carriages, from 3.50 pesetas to 2.25 pesetas per kilo.[1]
1500—Inner tubes, used or not, from 8 pesetas to 5.50 pesetas per kilo.[1]
1501—Outer tire covers, used or not, with or without parts of other materials from 6 pesetas to 4 pesetas.[1]

[1] Conventional rates already accorded France in recent treaty.

PROMINENT BRITISH RUBBER MANUFACTURER VISITS AMERICA

The timely visit to the United States of Philip H. Lockhart, chairman of W. and A. Bates, Limited, Leicester, England, is attracting the attention of American rubber manufacturing interests. Mr. Lockhart, having planned an unofficial visit to America, was requested by the India Rubber Manufacturers' Association of Great Britain to interview the Rubber Association of America on the subject of the Stevenson rubber restriction scheme. As representing a well-known firm of British rubber manufacturers, Mr. Lockhart is especially desirous of meeting those in America who are identified with the producing side, and conferring with them regarding a subject of such vital importance to both. He is a past chairman of the India Rubber Manufacturers' Association, as well as being at present connected with certain leading British industrial organizations.

P. H. Lockhart

In Mr. Lockhart's opinion the price of rubber at this time, even without the Stevenson restriction scheme, would have reached 1*s.* a pound, while there should be no restriction after the price has risen to 1*s.* 6*d.* a pound. Under present conditions there is a tendency to encourage speculation, and in order to avoid this Mr. Lockhart advocates certain alterations in the restrictions, with provision for larger and quicker releases of rubber. As representing the point of view of the British rubber manufacturer, rather than that of the stockholder, Mr. Lockhart's visit at this time is of particular importance, especially as this is the first time that a representative of British rubber manufacturing interests has conferred with similar representatives of the United States.

HARDING FAVORS RUBBER APPROPRIATION FUND

In view of a possible rubber shortage and as the result of the uncertainties brought about through the operation of the Stevenson rubber restriction scheme, President Harding is in favor of a special appropriation of $500,000 for an investigation regarding the possibilities of American rubber cultivation in the Philippines and Central and South America. Senator Medill McCormick of Illinois who has been especially interested in the matter has urged that the Department of Commerce should undertake a special study of the situation, and to this proposal Secretary Hoover has replied favorably, stating as his belief that, while the supply of crude rubber may be adequate for present needs, a greater production amounting to 50 per cent must be forthcoming to meet growing demands, and in order to prevent a shortage during the next ten years.

INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC
GUTTA-PERCHA
Reg. U.S. Pat. Off.
Reg. United Kingdom.

Vol. 67 MARCH 1, 1923 No. 6

TABLE OF CONTENTS

	Pages
Editorials	
Rubber Latex and Dispersed Rubber	343
For American Owned Rubber	343
Foremen Are Keymen	344
Statistical Reports Necessary	344
Pride in Rubber Craftsmanship	344
Philippine Rubber Planting Possibilities...Illustrated	345-346
Handling Stores and Store Records in Rubber Factories...Forms	347-349
Inquiries and Trade Opportunities	349
Cold Molded Hard Plastics...Illustrated	350-352
Rubber Restriction Problems	352
The Use of Carbon Dioxide in Air Bags By Harry R. Minor...Illustrated	353-354
Method of Attaching Crêpe Rubber Soles	354
Non-Skid Tire Tread Design...Illustrated	355-356
Abrasion Testing Machine...Illustrated	357
Tire and Rim Association Standards...Graphs	358
Chemistry	
What the Rubber Chemists Are Doing	359-361
Chemical Patents	361
The Tensile Testing of Rubber By G. Stafford Whitby...Graph	362-364
Internal Mixers...Illustrated	364-365
New Machines and Appliances...Illustrated. Quick Acting Tire Building Core. Machine for Paper Wrapping Tires. Spur Gear Speed Reducers. Motor Driven Bench Saw. Air Chuck. Laboratory Steam Vulcanizer. Machine for Applying Small Solid Tires. Electric Grinder and Buffer. Indicating Caliper. Recording Sclerescope. Machine for Pasting Labels.	366-368
Machinery Patents...Illustrated. Steam Connection for Tire Cores. Gage for Calendered Stock. Other Machinery Patents.	368-369
Process Patents	369
Editor's Book Table. "Rubber—The Product With a 1001 Purposes." "Handbook of Chemistry and Physics." "Plastics and Molded Electrical Insulation." "Theoretical and Applied Colloidal Chemistry." "Cotton Facts." "Properties of Electrical Insulating Materials of the Laminated Phenol-Methyline Type." "Export Merchandising." "Handbook for 1921 of the State of British North Borneo." "Government of the Gold Coast—Report on the Agricultural Department for the Year 1921."	370-371
Abstracts of Recent Rubber Articles	371
New Trade Publications	371
Judicial Decisions	371
New Goods and Specialties...Illustrated. Stamp Pad with Rubber Base. Novel Rubber "Ball." Anti-Rattlers for Automobiles. New Air-Tight Valve Core. Apron for Workers in Acids. Rubber Apparatus for Sponge Fishing. Heavy Rubber-Soled Shoes Without Laces. Rubber Soles of One and Two Units. A New Tire Flap. Cord Tires in Ford Sizes. The Studebaker-Wulff Cord Tire. Bounder for Exercise and Amusement. Rubber Buffers Between Body and Chassis. Heavy Duty Inner Tube. Men's Padless Garter. Hartland Hat Carrier. Combination Rubber Mat and Step-Plate. Steel Blowout Boot. Seamless Bias Tape. A Non-Sticking Battery Tester. Slipless Cord Cone Belt. Three New Tires in the Republic Line.	372-374
The Rubber Association of America—Activities of	375-376
Interesting Letters From Our Readers	376
Obituary Record. Professor William Henry Goodyear. Lee H. Heist. Thomas M. Gregory.	376
New Incorporations	376
American Rubber Trade—News and Personals	
Financial	377
Dividends	377
Stock Quotations	377
East and South	377-378
Sheldon Perry Thacher...Portrait and Sketch	378
New Jersey	378-379
Rhode Island	379
Massachusetts	379-380
Myron H. Clark...Portrait and Sketch	381
Ohio...Illustrated	381-383
Midwest...Illustrated	383-384
Pacific Coast	384
Foreign Rubber News	
Great Britain...By Our Correspondent	385-386
France and Germany...By Our Correspondent	387
Planting	
Far East...By Our Correspondent	388-389
Patents Relating to Rubber. United States. Canada. United Kingdom. New Zealand. Germany.	390-392
Trade Marks. United States. United Kingdom. Canada. New Zealand.	392-393
Designs...Illustrated. United States. Canada.	393
Markets:	
Crude Rubber, London Annual Review...Graph	394-396
Monthly Review	397-398
Highest and Lowest New York Spot Rubber Prices	398
Reclaimed Rubber	398
Rubber Scrap	404
Cotton and Other Fabrics	405
Course of the New York, New Orleans and Liverpool Spot Cotton Market 1916-1923...Graph	406
Chemicals and Other Ingredients	407-408
Statistics	
Brazil, Exports of India Rubber from Manaos and Iquitos During the Year 1922	393
Canada, Statistics for November, 1922	404
Java Rubber Exports	403
Malaya (British) Rubber Exports	398
United Kingdom, Statistics for December, 1922, and for Year 1922	402-403
Rubber Imports and Exports, Year 1922	402
United States.	
Crude Rubber Arrivals at New York as Stated by Ship's Manifests	399
Exports of India Rubber Manufactures During December, 1922	400-403
Custom House Statistics, October, 1922	404
Supply and Consumption of Cotton	406
Foreign Tariffs	409
P. H. Lockhart Visits America...Portrait	409

923

Pages
2-374

5-375
375
376

376

377
377
377
7-378
378
8-379
379
9-380
381
1-383
3-384
384

5-386
387

8-389

0-392

2-393

393

4-396
7-398

398
398
404
405

406
7-408

393
404
403
398

2-403
402

399

0-403
404

406
409
409